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Organizing the rail-related services in deregulated railway markets – Learning from Swedish, Danish and British experiences

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Keywords: education, deregulation, rail-related services, railway market, rolling stock maintenance

Summary

The European Union has highlighted several topics in order to create a more environmentally friendly market area. The rail-related paper and soon approaching new emission levels are leading to a situation, where countries need to pay special attention to the modes of transport. Railway transport has been proposed as an option to facilitate the situation. Although deregulation has significantly improved the railway market, some issues are not cautiously handled. For example, in order to have a well-functioning operational market, the rail-related services need to be organized in a manner, which fulfils the requirements of all market actors.

This research had two main objectives. It evaluated the progression of organizing the rail-related services in deregulated markets, concentrating on three target countries. Secondly, the aim was to clarify the current status of deregulation and privatization in the markets, and evaluate the future prospects in the railway sector. In the research both qualitative and quantitative research methods were utilized. The extensive literature analysis including quantitative data created the basis for the research, which was completed with qualitative empirical data. It was gathered by interviewing Swedish, Danish and British railway experts using a semi-structured theme interview. The research provided novel information on the topic which has not been widely studied; only few analyses are available but none with the same amount of qualitative research as in this study.

Based on this research, there are both similarities and discrepancies in organizing the rail-related services. In Sweden and the UK the rolling stock maintenance is organized either in-house or outsourced to external maintenance companies, while in Denmark all maintenance is done in-house for taxation reasons. The style of arranging education is diverse in all countries. In the UK engine drivers are trained in-house, the Danish market has two public schools while the Swedish market has many organizations offering railway education. When considering the ticket sales both Denmark and the UK have a binary system: Both interoperable and company-specific tickets are available, whereas in Sweden all operators have their own tickets, which causes problems to customers.

Milla Laisi: Rautatieliikenteen tukitoimintojen järjestäminen vapautuneilla rautatiemarkkinoilla – Kokemuksia Ruotsin, Tanskan ja Englannin markkinoista. Liikennevirasto, liikenteenhallinta-toimiala. Helsinki 2012. Liikenneviraston tutkimuksia ja selvityksiä 26/2012. 90 sivua ja 25 liitettä. ISSN-L 1798-6656, ISSN 1798-6664, ISBN 978-952-255-171-9.

Asiasanat: koulutus, markkinan vapautuminen, rautatiemarkkinan tukitoiminnot, rautatiemarkkina, liikkuvan kaluston huolto

Tiivistelmä

Ympäristön merkityksen kasvaessa Euroopan Unioni on nostanut esiin useita aihealueita, joita tulisi kehittää. Valkoinen Kirja ja pian voimaantulevat uudet päästörajoitukset ovat johtamassa tilanteeseen, missä maiden pitää kiinnittää erityistä huomiota käytettäviin kuljetusmuotoihin. Helpotukseksi tilanteeseen on tarjottu rautatiekuljetuksia. Vaikkakin rautatiemarkkinoiden vapautuminen on kehittänyt rautatiemarkkinaa, kaikkiin tarvittaviin aihealueisiin ei vielä ole puututtu. Esimerkiksi, jotta rautatiemarkkina on operatiivisesti toimiva, rautatiemarkkinan tukitoimintojen pitää olla järjestetty tavalla, joka täyttää kaikkien osapuolien vaatimukset.

Tällä tutkimuksella oli kaksi päätavoitetta. Tarkoituksena oli tutkia rautatiemarkkinan tukitoimintojen organisointia markkinoilla, jotka on jo avattu kilpailulle. Toisena tavoitteena oli selvittää kohdemarkkinoiden rautatiemarkkinan vapautumisen nykytilanne, ja eritellä rautatiemarkkinoiden tulevaisuuden mahdollisuuksia. Tutkimuksessa käytettiin sekä kvalitatiivista että kvantitatiivista tutkimusmenetelmää. Laaja kirjallisuuskatsaus sisältäen kvantitatiivista tilastotietoa loi tutkimukselle pohjan, jota täydennettiin kvalitatiivisella empirialla. Empiirinen osuus toteutettiin tapaustutkimuksena, ja siinä haastateltiin ruotsalaisia, tanskalaisia ja englantilaisia asiantuntijoita käyttäen puolistrukturoitua teemahaastattelua. Tutkimuksen myötä saatiin uutta tietoa aiheesta, jota ei ole ennen laajasti tutkittu. Aihealueen tiimoilta löytyy muutamia tutkimuksia, muttei tämän tutkimuksen tapaista yhtä laajaa kvalitatiivista työtä.

Tutkimuksessa tehtyjen havaintojen mukaan kohdemaiden rautatieliikenteen tukipalveluiden organisoinnissa on sekä yhtäläisyyksiä että eroavaisuuksia. Ruotsissa ja Englannissa liikkuva kalusto huolletaan joko omassa huoltohallissa tai huolto on ulkoistettu ulkopuoliselle huoltopalvelun tarjoajalle. Tanskassa yritykset tekevät kaikki huoltotoimet itse verotuksellisista syistä. Myös koulutuksen järjestäminen eroaa kohdemaissa. Englannissa rautatieyritykset kouluttavat omat veturinkuljettajansa. Tanskassa on kaksi julkista oppilaitosta, jotka kouluttavat veturinkuljettajia. Ruotsissa on useita oppilaitoksia, jotka tarjoavat rautatiealan koulutuspalveluja. Sekä Tanskassa että Englannissa oli kaksi erilaista lipputyyppiä; koko verkon kattava lippu sekä yksittäisten operaattoreiden omat liput. Ruotsissa jokaisella toimijalla on oma lippunsa, mikä aiheuttaa hankaluuksia asiakkaille.

Milla Laisi: Organisering av järnvägstrafikens stödfunktioner på avreglerade järnvägsmarknader - erfarenheter från marknaderna i Sverige, Danmark och England. Trafikverket, trafik ledning. Helsingfors 2012. Trafikverkets undersökningar och utredningar 26/2012. 90 sidor och 25 bilagor . ISSN-L 1798-6656, ISSN 1798-6664, ISBN 978-952-255-171-9.

Nyckelord: utbildning, avreglerad marknad, järnvägsmarknadens stödfunktioner, järnvägsmarknad, underhåll av rullande materiel

Sammandrag

Miljön blir allt viktigare och därför har Europeiska Unionen lyft fram flera teman som borde utvecklas. Vitboken och de nya gränsvärdena för utsläpp, som snart träder i kraft, är på väg att leda till en situation, där länderna måste fästa särskild uppmärksamhet vid transportformerna som används. Järnvägstransporter är ett alternativ som framhållits för att underlätta situationen. Även om avregleringen av järnvägsmarknaderna har utvecklat järnvägsmarknaden, så har man ännu inte ingripit på alla områden där det skulle behövas. Till exempel, för att järnvägsmarknaden ska fungera väl, borde stödfunktionerna för järnvägsmarknaden organiseras så att de uppfyller alla parters krav.

Den här undersökningen hade två huvudsyften. Det första var att undersöka hur järnvägsmarknadens stödfunktioner organiserats på sådana marknader som redan har öppnats för konkurrens. Det andra målet var att studera nuläget för avregleringen av järnvägsmarknaden samt utreda järnvägsmarknadernas framtidsutsikter. I undersökningen användes både kvalitativa och kvantitativa undersökningsmetoder. En omfattande litteraturöversikt som innehöll kvantitativa statistikuppgifter skapade grunden för undersökningen, som kompletterades med kvalitativ empiri. Den empiriska delen genomfördes som en fallstudie, inom ramen för vilken svenska, danska och engelska sakkunniga intervjuades i form av halvstrukturerade temaintervjuer. I samband med undersökningen kom det också fram sådan ny information om ämnet, som ännu inte har undersökts i någon större utsträckning. Det finns några andra undersökningar inom det här ämnesområdet, men inget lika omfattande kvalitativt arbete som den här undersökningen.

Undersökningen visar att det finns både likheter och skillnader i sättet på vilket järnvägstrafikens stödfunktioner organiseras i länderna som ingår i studien. I Sverige och England underhålls den rullande materielen antingen i de egna servicehallarna eller så har underhållet lagts ut på entreprenad till en utomstående tjänsteleverantör. I Danmark utför företagen själva alla underhållsåtgärder av skatteskäl. Också anordnandet av utbildning skiljer sig i de olika länderna. I England utbildar järnvägsföretagen själva sina lokförare. I Danmark finns det två offentliga läroverk, som utbildar lokförare. I Sverige finns det flera läroverk, som tillhandahåller utbildningstjänster inom järnvägsbranschen. Både i Danmark och i England finns det två olika typer av biljetter; dels en biljett som täcker hela nätverket, dels de enskilda operatörernas egna biljetter. I Sverige har varje aktör en egen biljett, vilket gör det krångligt för kunderna.

Foreword

This work was accomplished at Lappeenranta University of Technology, Kouvola Research Unit. It was ordered by the Finnish Transport Agency. Research was conducted by Doctoral student, M.Sc. (Econ.) Milla Laisi. The work's steering group consisted of four experts: Senior Officer Kaisa-Elina Porras from the Finnish Transport Agency, Ministerial Adviser Risto Saari from the Ministry of Transport and Communications, Special Adviser Mertti Anttila from Finnish Transport Safety Agency, and Director Heidi Niemimuukko from Finnish Transport Safety Agency. From the Lappeenranta University of Technology's side, supervisor was Professor Olli-Pekka Hilmola.

The research represents the viewpoints of the researcher and is as such not an official or binding policy of the Finnish Transport Agency.

Helsinki, August 2012

The Finnish Transport Agency
Traffic Management

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Abbreviations

BR	British Railway
BRML	British Rail Maintenance Limited
CPTA	County Public Transport Authority
DB	Deutsche Bahn
DG MOVE	Directorate General for Mobility and Transport
DSB	Danish incumbent
EEC	European Economic Community
EIM	European Infrastructure Managers
EU	European Union
EWS	English Welsh & Scottish Railway
FOC	Freight Operating Company
GDP	Gross Domestic Product
JNR	Japanese National Railways
JR Group	Japan Railways Group
OPRAF	Office of Passenger Rail Franchising
ORR	Office of Rail Regulation
Passenger kilometre	Transport of one passenger over one kilometre
RFF	Rèseau Ferré de France, French infrastructure manager
SJ	Statens Järnvägar, Swedish incumbent
SNCF	French incumbent
TOC	Train operating company
Tonne kilometre	Transport of one tonne over one kilometre
UIC	International Union of Railways
UK	United Kingdom
US	United States
Vehicle kilometre	Movement of road vehicle over one kilometre

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1 Introduction

This study examines the rail-related services in three countries, Sweden, Denmark and the United Kingdom. The study's main objective is to understand how the rail-related services are organized in deregulated market environments. Study scrutinizes the progress of deregulation in case countries and describes how the stakeholders acting in the market have confronted the changing market structure. Finally, research tries to understand the future prospects and main challenges in the three market areas. The research is the Finnish Transport Agency's project related to this topic, and it is executed at Lappeenranta University of Technology's Kouvola Research Unit.

1.1 Background of the research and research gap

Transport has become one of the core activities in the economy. In today's society everybody is either directly or indirectly influenced by transport. (Kingham et al., 2001) Transport sector has confronted various changes during the last decades, and same trend is expected to continue in the future. Increased transport volumes in sea and inland transport, new sulphur regulations for example in the Baltic Sea area, stricter emission regulations and other changes are putting a lot of pressure on the transport market environment. European Union has introduced the 20-20-20 targets, which should be met by the year 2020. Targets include a reduction of greenhouse gas emissions by 20 per cent below the level of 1990, 20 per cent of EU's energy consumption should be originating from renewable resources and the primary energy consumption should be reduced by 20 per cent by improving the energy efficiency. (EU, 2010) The objectives have been taken even further in White Paper (2011), which extends the targets till 2050. Among the main goals is to shift 50 per cent of medium distance passenger and freight journeys from road to rail or to sea transport. Generally the objectives are very strict, and those cannot be achieved without considerable structural changes in transport sector. (White Paper, 2011) Railway transport has been stated as an option to facilitate the situation.

When considering the worldwide alterations in the transport sector, one of the most significant changes has been the transport deregulation. The process was started in the United States in 1978 when the Airline Deregulation Act was introduced. The Act withdrew price and entry restrictions which had dominated the industry since 1938. (Lehn, 2002; Winston, 1993) The deregulation progression continued in the US in 1980, when railway and road transport were deregulated by Staggers Rail Act and the Motor Carrier Act, respectively (Jahanshahi, 1998; Lafontaine and Malaguzzi, 2005; Winston, 1993). The trend permeated apace worldwide; for example Japanese National Railway (JNR) was privatized in 1987, when the company was divided into one freight and six passenger companies (Matsumoto, 2007). In Europe the first railway sector to be deregulated was the freight market; the competition has entered the markets concurrently with development of the European Union. The first countries to deregulate freight transport were the United Kingdom, Sweden and Germany (Jahanshahi, 1998). The situation changed again in the beginning of 2007, when the member countries had to deregulate the railway freight markets due to European

Union legislative demands. Nevertheless, the passenger transport market has been only partly deregulated. 1st January 2010 European Union opened the international transport for competition, but national markets are still under governmental regulations. Some countries have proceeded almost identically with freight and passenger transport. In the United Kingdom the objective of making British Rail attractive to private sector was introduced in the Railways Act in 1993. Unprofitable passenger operations were franchised as the intention was to reduce the amount of public subsidies. (Knowles, 1998) Although railway infrastructure company Railtrack tried to operate the market efficiently, due to lack of investments network was in deficient condition and passenger trains accuracy declined from 90 per cent to 60 per cent. After five years the company was badly in debt and bankrupted in 2001. (Hilmola et al., 2007; Szekely, 2009) During the last decade the market has improved significantly. Increased numbers of infrastructure investments and market actors who are working for a common goal have built a market, which is functioning well. Sweden and Germany followed the British actions and started the deregulation process in 1990s (Geyer and Davies, 2000; Jensen and Stelling, 2006).

As opposite to British radical model has been regarded the incremental way, which was utilized for example in Sweden. The freight transport was deregulated in 1990s and today the market has dozens of operators. In the passenger transport sector the situation has been progressing slowly but surely. The progress started already in 1988 by the Transport Policy Act, and a milestone was attained in 1993 when the state negotiator got a right to use competitive tendering. The first company entered the market via tendering in 1999, despite the state-owned SJ's actions to hinder the market entry. In 2007 SJ lost its monopoly on night trains and charter trains. The completely free access was established on 1st October 2010. After the market was opened for competition, numerous railway undertakings have entered the market. (Alexandersson and Hulten, 2009; Hilmola et al., 2007; Network Statement, 2012) According to the Ministry of Transport and Communications (2010), deregulation experiences have been positive in Sweden and passenger volumes have increased.

Danish transport market has proceeded rather steadily in deregulating the passenger market. The market is not totally deregulated, but some private railway undertakings have entered the market via certain arrangements. Four of the companies have longer experience, due to the fact they are private railway undertakings owning also the network. These companies are located around Denmark and typically the operation radius is rather small. Additionally, two railway undertakings have entered the market via tendering processes. The first tender was out in 2002 and operations started in 2003; second one was open for bidding in 2008 and operations started in 2009. Both cases confronted some challenges, but mainly the market entry of private undertakings has been noted as a positive aggregate. (Laisi and Poikolainen, 2011; Ministry of Transport and Communications; 2010)

Although matters related to railway markets have been widely studied in numerous studies (see for example Alexandersson and Hulten, 2009; Anttila and Wallin, 2010; Currie and Delbosc, 2011; Dell'Olio et al., 2011; Grdzelishvili and Sathre, 2011; Ieda et al., 2001; Kingham et al., 2001; Laisi, 2009; Laisi and Poikolainen, 2011), the concentration has been on the operations, either passenger or freight. Only few studies have touched on rail-related services, meaning for example rolling stock maintenance, education and ticket sales. There exists a clear gap of studying how the

rail-related services are organized. This study tries to tackle the gap. Especially we are interested in understanding how the deregulation process has influenced on organizing the services, and what have been the major drawbacks and positive aspects during the process. As the international railway market is improving continuously, data provides new knowledge both to academia as well as business world.

1.2 Objectives of the research and research problem

The objective of the study is to examine the rail-related services in three countries which have deregulated the railway markets, Sweden, Denmark and the United Kingdom. The main concentration is on studying the rail-related services, and the topic cannot be thoroughly tackled without a proper examination of the progress of deregulation in the case countries. The study first scrutinizes the topic via extensive literature analyses and brings it to empirical level by analyzing the experts' standpoints. The purpose of the study is to unfold how the rail-related services are organized in deregulated railway markets, and what kind of obstacles the actors have confronted during the way. On the other hand, also positive outcomes and future prospects are highlighted.

Research's objective is to deliver new insights and describe the status of rail-related services in three countries. The intention is to gather novel information by interviewing the different interest groups. The deregulation processes have attracted numerous researchers worldwide and markets are rather completely analyzed, but there exists a lack of concentrating on the rail-related services. Studies have mainly concentrated on certain market areas, for example the UK, but there exists a lack of combining these three countries. Previous studies mainly focus on literature analyses and scarce empirical data. This study brings the topic to new level by examining the results via viewpoints of 19 interviewees.

By developing the research's objective, research questions are developed. Four sub-questions follow the research question, with an objective to support the research purposes.

The main research question of the study is:

How the rail-related services are organized in deregulated railway markets?

The sub-questions are:

1. What have been the main confronted challenges in rail-related services and how those have been clarified?
2. What kind of positive impacts have been noted?
3. Has the market deregulation influenced on the interest groups' cooperation?
4. What are the main future possibilities in Swedish, Danish and British railway markets?

1.3 Delimitations

Railway industry restructuring is very widely studied, but the research works have mainly concentrated on the operations, both freight and passenger sectors. Additionally, the works have mainly concentrated on liberalization pioneers, for example the UK, Germany and Sweden. This study provides new standpoints by investigating the situation in rail-related services. Research is limited to focus only on railway transport, the other railway traffic options utilizing tracks, namely metro and tramway, are excluded from this study. Also the railway infrastructure maintenance is excluded from the study.

Study's empirical section is limited into three countries, Sweden, Denmark and the UK. Several companies operating in these countries have wide range of operations in other European Union member countries, but those functions are excluded from this study. Because the number of market actors is rather extensive, an inclusive sample was chosen. The sample included organizations from all different stakeholders such as educational institutions, rolling stock maintenance companies, railway undertakings and governmental actors. This ensures the collected data is accurate and reflects various interest groups' standpoints. In 11 cases only one person was interviewed per organization, which can be noted as delimitation. All interviewees were in managerial or such a position. All interviews were done in English except for one, which was done using both Swedish and English. As research's main objective is to study the rail-related services as an ensemble, companies' and organizations' all functions are not included.

1.4 Definitions of the key concepts

Rail-related services
By rail-related services are meant the factors, which are enabling the railway operations to happen. Without rail-related services the market would not function. This study concentrates on rolling stock maintenance, education, ticket sales and stations.

Deregulation
In this study deregulation refers to opening the market for competition. After market is deregulated, new companies can enter the market. Synonyms for market deregulation are for example open up the market, market liberalization and opening the rail network.

Rolling stock maintenance company
In order to assure the rolling stock fleet is functioning well, the fleet needs to be maintained. Rolling stock maintenance companies are the organizations which are concentrating on offering maintenance for rolling stock.

Educational institution
In this study educational institution refers to places, which are offering education related to railway industry. As railway is rather extensive industry, this work concentrates on education of engine drivers.

Railway undertaking
Railway undertaking refers to privately owned company, who practices railway transport as its main business. Synonyms for railway undertaking are for example railway company, railway operator and railway enterprise.

Railway transport
Railway transport stands for transporting people or cargo on tracks. The other railway traffic alternatives, metro and tramway, are excluded from this study.

1.5 Research methodology

The research methods can be divided into two, qualitative and quantitative. The main difference is that qualitative research concentrates on words, while quantitative method tackles the topic via numerical data (Eisenhardt, 1989). Qualitative research is widely chosen when studying an aggregate which is not yet extensively studied, as among its main objectives is to understand the theme (Hirsjärvi et al., 2009; Jarratt, 1996). When considering the research types, three main strategies are unfolded. These are experimental, survey and case study research. Experimental research concentrates on how the changes in one variable affect on another one, while survey research's main objective is to gather data with standardized model from a group of people. Case study research, which is utilized in this research, main strategy is to describe, compare and explain phenomena. Furthermore, case study concentrates on few persons and tries to tackle more intensive data concerning a certain topic. Although case study is often regarded as being closely related with qualitative research, it may as well involve quantitative data or both. The special characteristic of case study is that it does not draw only on previous literature or former empirical evidence, building the theory from case study approach is expedient. (Eisenhardt, 1989; Hirsjärvi et al., 2009; Yin, 1981)

Case study has become a widely utilized form of research; especially it has attracted researchers doing research in the field of logistics. The method is noted practical when studying novel topics (Eisenhardt, 1989). According to Häkkinen and Hilmola (2005), case studies in logistics have mainly concentrated on descriptive research objectives. Often case study is considered to focus only on one case company. This do not need to be the case, as amount of cases can vary between four and ten if it is needed in order to assure the extensive database. (Eisenhardt, 1989) This research utilizes case study as a research method. Due to lack of first hand empirical data, by interviewing experts from Swedish, Danish and British railway markets it was possible to gather grass-root information. Research consists of 15 interviews, presented by 19 persons. Therefore can be noted the database is extensive enough, in order to guarantee the level of knowledge.

Two methods of reasoning are often referred in research, inductive and deductive approaches (Burney, 2008). The main discrepancy lies in way of reasoning. Inductive generates new knowledge for present theories. Deductive concerns the topic from general to specified data, as logical thinking is used as generic tool when creating a proper construction. (Brown and Eisenhardt, 1997; Burney, 2008; Hilmola, 2003) Case studies are often noted to utilize inductive approach, but Hilmola (2003) has noted often researchers using case study as a research method are combining both

approaches (Häkkinen and Hilmola, 2005). However, this study is mainly concentrating on inductive approach. Study's objective is to present new findings and confirm the existing ones, which fulfils the facts related to inductive method.

1.6 Structure of the research

In chapter 1 was introduced the topic of the study. Background information and objectives were presented, which created the basis for the work. Delimitations and research methodology were described and research questions and key concepts were demonstrated. Chapter 2 introduced the status of railway deregulation. After general level the information tackled the European Union, and finally the situation in target countries, Sweden, Denmark and the UK were presented. Sub-chapters described the railway transport deregulation progress in the countries and highlighted some key figures from the markets.

Chapter 3 concentrated on the rail-related services. It described the background of rail-related services and introduced the situation in Europe. The sub-chapters evaluated the two biggest rail-related service markets, rolling stock maintenance and education. In addition to general level, the situation in target countries was illustrated. Following Chapter 4 presented the research environment. Approach for research was delineated, where after the theme interview was presented. Additionally, collecting the data unfolded ways how the data was gathered. Empirical standpoints were presented in Chapter 5. Chapter 6 brought the empirical findings to theoretical level and discussed the reasons behind the unfolded factors. Finally Chapter 7 engrossed to main results. Theory and empirical data were concluded and discussed more deeply. Furthermore, limitations and suggestions for further research were presented in this Chapter.

2 Railway Transport Market

Since the inception of railway transport, many nations have stated them critical to countries' early development. In the United States railways provided a way for formerly inaccessible areas to be evolved: For example mineral, agricultural and timber products could find the way to markets. Furthermore, railway bounded together the developed and undeveloped areas. During the decades the transported freight volumes have multiplied, for example in 1980 in US railways were transported 932 billion ton-miles, while the corresponding figure in 2007 was 1.820 billion. (AAR, 2012) Alike in the US, also in Europe railway was used to transport bulk cargo, for example in the UK wagonway was constructed in order to transport coal from mines to canal, where it was transferred to vessels and transported onwards (Schivelbusch, 1996). Railway is also stated to be one of the major reasons for rapid industrialization in the UK (Bloy, 2011).

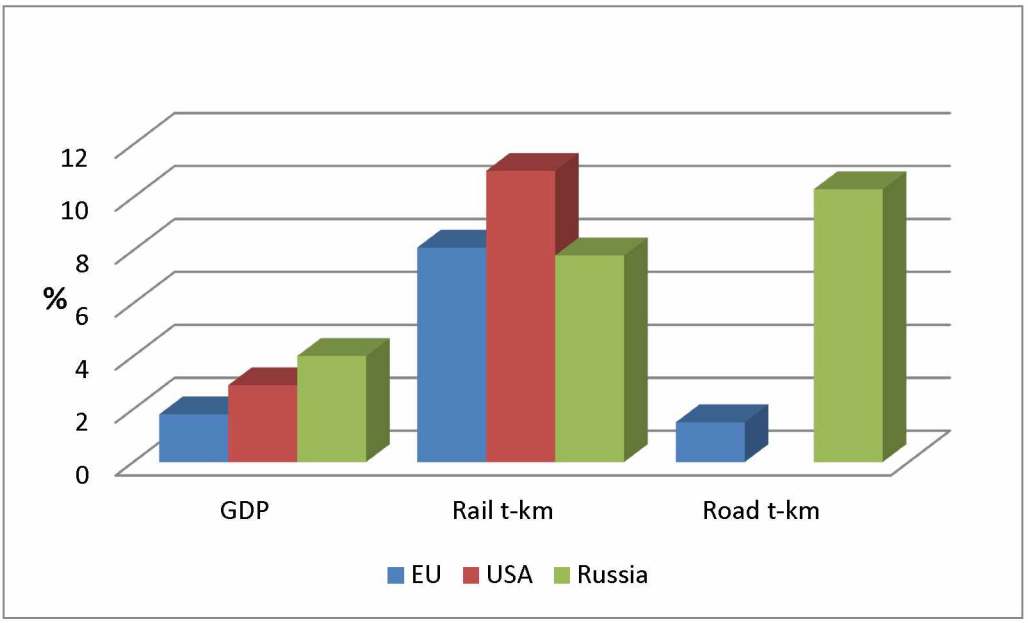


Figure 1 *Market area's GDP, rail tonne-kilometres and road tonne-kilometres in 2010, percentual change from the previous year (OECD, 2011)*

Figure 1 describes the percentual changes between 2009 and 2010 in few large market areas, European Union, USA and Russia. After the economic recession confronted in 2008-2009, the national gross domestic products and transported tonne-kilometres both in railway and road have increased. When considering only the railway sector in some chosen countries, especially freight sector has gained growth (see table 1).

Table 1 *Rail freight transport volumes and passengers carried in chosen countries in 2010 (OECD, 2011)*

	Goods transport (million t-km)				Passengers carried (million p-km)	
	National		*International*			
	2010	**Change % 10/09**	**2010**	**Change % 10/09**	**2010**	**Change % 10/09**
Denmark	167	35.8	2072	31,5	6586	3,5
Sweden	15109	13,70	7224	18,10	11204	-1,2
UK	18532	-3,3	n/a	n/a	53328	5,7
EU	187843	6,6	160628	9,9	353305	0,3
USA	2456464	11	n/a	n/a	10332	8,6
Russia	2011308	7,8	n/a	n/a	139028	-8,2

Although freight is often noted to be the main user of railway transport, some market environmental changes have been discerned. During the last decades the communities have grown and both size and shape of cities has changed. In most developed countries inhabitants settle to capital areas, which create pressure on city planning. Earlier studies (see for example Bartling, 2010; Kingham et al., 2001; Waddell et al., 2007) have highlighted that public transport have substantial influence on suburbanization. If public transport is organized inadequately, commuters are utilizing cars which cause congestions.

Alike in many other industries (for example telecommunications, air transport, postal services) railway sector has long history of monopolies. During the last decades the trend has turned towards liberalism, which has been one of the main objectives when changing the market environments. (Quinet and Vickerman, 2004) Term "deregulation" can be defined as measure done to privatize and expose earlier state-owned monopolies to competition (Alexandersson and Hultén, 2009). The first country to deregulate railway market was the United States, which opened the market for competition via the Staggers Rail Act in 1980. Before choosing this path the US railway market had confronted serious problems: By 1978 the rail share of intercity freight had fallen from 75 per cent (1920s) to 35 per cent. The hard regulation continued to harm the industry, and the US Department of Transportation stated in 1978:

"The current system of railroad regulation.... is a hodgepodge of inconsistent and often anachronistic regulations that no longer correspond to the economic condition of the railroads, the nature of intermodal competition, or the often conflicting needs of shippers, consumers and taxpayers" (ARR, 2011).

The market condition was untenable, which led to situation where Congress had two options. Either they could nationalize the railways, or replace the indecent regulation with a more balanced regulatory framework. Congress chose the balance regulation, which led to the Staggers Rail Act in 1980. By passing the Act, Congress acknowledged that railways confronted intense competition for most of the traffic, but immoderate regulation prevented the market from competing effectively. In order to survive, the market needed a new system which allowed them to act like other businesses, especially in terms of managing their assets and pricing the services. The Staggers Rail Act opened the doors for new era by providing the market greater pricing freedom, it streamlined the timetables and expedited the line abandonment process, which allowed multimodal ownership and permitted confidential contracts

with shipping companies. The more balanced market environment which was achieved by deregulating the market was a great success for rail shippers and whole industry. Railway market share showed slow growth, and both the productivity and financial situation improved. Furthermore, train accidents reduced 77 per cent. (ARR, 2011; Rodrigue et al., 2009; Waters, 2007)

Another country which deregulated the railway sector in rather early stage was Japan. Due to the huge debts and mismanagement, Japanese National Railways (JNR) was privatized in 1987 into six private regional passenger companies (collectively called the Japan Railways Group, JRs: West Japan Railway, East Japan Railway, Central Japan Railway, Hokkaido, Shikoku and Kyushu) and a nationwide freight operator (Matsumoto, 2007; Obermauer, 2001). Due to the process the JRs were free from state control, meaning they got freedom to decide for example ticket prices and service levels. Because companies were formed based on their geographical location, there was hardly any competition. As an outcome of the privatization process was better service level, increased number of routes and rather small increases in ticket prices. The positive outcomes were also regarded in figures: The traffic grew around 20 per cent between 1987 and 1991, and the productivity of labour per vehicle-km grew annually 15.5 per cent between 1985 and 1989. (Quinet and Vickerman, 2004)

When considering the passenger rail transport, two types of sub-groups can be found. Division to regional (commuter) and long-distance transport is standard way to categorize different types of journeys. Regional transport includes commuter, local and regional traffic, whereas Intercity, Eurocity, night trains as well as high-speed rail transport are counted in long-distance transport. (Alexandersson and Hulten, 2009; Beckers et al., 2009; De-Los-Santos et al., 2010) During the last decade the network of high-speed lines has increased worldwide but especially in Europe, which has formed a new way to travel long-distance journeys. Based on the definition by Union of International Railways (UIC, 2010), high-speed rail is rail operations of at least 250 km/h. The main characteristic is that the trains run through densely populated areas, having connections to the countries' main cities. (Nakagawa and Hatoko, 2007) One of the world's most famous high-speed rail and at the same time also the oldest is the Japanese Shinkansen system, which was introduced in 1964. The Tokaido Shinkansen linked the cities of Tokyo and Osaka (515 kilometres), and decreased the travel time to three hours and ten minutes. Since, the travel time has even shortened and more Shinkansen lines have been opened. Shinkansen system is highly appreciated by both business and tourist travellers, and today more than 400 000 passengers take the trains daily. (Hsu et al., 2010; JR, 2012; Matsumoto, 2007; Nagakawa and Hatoko, 2007; UIC, 2010) The great success of Shinkansen had a high impact on the worldwide introduction of high-speed rail network. First country to launch high-speed railway line in Europe was France, which introduced the connection between Paris and Lyon in 1981. Other central European countries followed the trend: Italian Direttissima started operations in 1988, German ICE trains in 1991 and Spanish AVE trains in 1992. One of the main cornerstones was achieved in 1994, when Eurostar connecting the UK and France via the Channel Tunnel started the operations. Europe is the leading area when comparing the number of operating high-speed trains: 59 per cent are running in Europe, 40 per cent in Asia and only one per cent in North America (UIC, 2010). Figure 2 introduces the high-speed and higher speed networks in Europe.

Figure 2 *High-speed rail networks in Europe (UIC, 2012)*

As described in figure 2, European high-speed network is concentrated on Western and Central Europe. Especially the number of existing high-speed lines (marked with red lines) is high in France, Spain and Germany, and many lines are planned to Spain, France and Portugal (marked with red dash lines). However, Eastern Europe is lagging behind. As an option has been offered Rail Baltica alignment, which would connect the Baltic States (Estonia, Latvia and Lithuania) to Germany via Poland. (RBGC, 2012; UIC, 2012)

Today the high-speed network is covering many developed countries offering smooth and quick transportation from city centres to city centres (Chou and Kim, 2009; Hsu et al., 2010; Nakagawa and Hatoko, 2007). The improved connections have taken the market share from air transport: If travel time by train is less than 2.5 hours, high-speed trains prevail 80 per cent of modal split compared to air transport (UIC, 2010). However, in order to attract even more passengers and maintain the competitive edge, special attention is needed in quality improvement. Once high-speed lines are able to attract loyal customers, they are more likely to use it in future and recommend the service to other possible passengers. (Anderson and Fornell, 2000; Chou and Kim, 2009)

2.1 European Union

Since the beginning of the European Union the concentration has been on forming an area, where free movement of people, goods, services and money is guaranteed. The European Economic Community (EEC), also known as the common market, was introduced in 1958 by signing the Treaty of Rome. (History of European Union, 2012) During the decades transport has become fundamental to European societies and vital for economy. The industry directly employs approximately 10 million people and accounts for around five per cent of gross domestic product. Expeditious transport networks are the key to European companies' possibility to compete in the world economy. This has a direct effect to people's quality of life, as the households spend approximately 13.2 per cent of the budgets on transport goods and services. (EU, 2012) Although European transport market has been extensively developed, current market environment is creating major challenges to the transport sector. Among these are congestions, oil dependency, greenhouse emissions, infrastructure and competition. Congestion affects road and air transport. According to EU (2012), it costs Europe about one per cent of its annual GDP. At the same time freight volumes are increasing. By 2030 volumes are forecasted to be around 40 per cent more than in 2005, and 80 per cent higher by 2050. Similar progress is anticipated in passenger sector, where figures are expected to grow 34 per cent up on 2005 by 2030 and 51 per cent by 2050. This has a direct connection with oil dependency. Although transport has become more energy-efficient, already today when the freight and passenger volumes are not in as high level as expected in few decades time, the sector depends on oil for 96 per cent of its energy needs. It is forecasted that oil will become scarcer in the future, wherefore it is evident that something needs to be done with transport sector. At the same time greenhouse emissions need to be reduced. White Paper (2011) stated the area needs to achieve 60 per cent decrease in transport sector's emissions compared with 1990 levels. The fourth theme is infrastructure, which is unequally developed across the European Union. Eastern part of EU is lagging behind in railway connection, as conventional rail network is in poor condition and the area is totally missing high-speed network (see figure 2 presenting the high-speed network map in section 2.). Furthermore, while worldwide transport markets are burgeoning, European transport sector confronts growing competition. (EU, 2012)

In order to make Europe's transport systems more efficient, European Union has introduced various actions to open both national and international markets to competition. Particularly this concerns road, waterway and air transport, but the trend has also extended to railway sector. In road sector trucks can operate also in other countries than their own, and they need no longer to return empty from international journeys. In air transport deregulation has involved more competition, lower ticket prices and more connections between European countries. The continuation of the trend is supported by "Single European Sky", which main initiative is to provide legislative framework to meet future demands of the European air transport market (Eurocontrol, 2012). In railway sector the deregulation has proceeded in several steps. Among the first steps was the Directive 91/440/EEC which was introduced in 1991 requesting separation of infrastructure management from railway transport operation. The Directive 95/18/EC set the licensing conditions for railway undertakings. T*he First Railway Package* was adopted by the European Parliament and the Council in 2001. The major elements of the First Railway Package were: (ORR, 2012a):

- the international railway freight market was opened for competition starting from 15 March 2004 (2001/12/EC),
- establish national regulatory bodies (2001/14/EC),
- conditions for capacity allocation and railway infrastructure charging (2001/14/EC), and
- Set out the conditions that railway undertakings need to meet in order to receive a license to operate on the European rail network (Directive 2001/13/EC, amending Directive 95/18/EC)

The Second Railway Package followed the first one in 2004. Its prime objective was to revitalize the railways through expeditious construction of an integrated European railway area. Its aim was to establish a legally and technically integrated European railway market. The package included five legislations and recommendations (ORR, 2012a):

- Common approach to railway safety was introduced via Directive 2004/49/EC (so called "Railway Safety Directive", amended in 2008 by Directive 2008/110/EC). It stated a clear procedure for granting safety certificates which all railway undertakings must procure before getting a right to run trains on the European network. It harmonized the safety levels in Europe by for example specifying what infrastructure managers need to do to receive safety authorization.
- Interoperability issues (including both European high-speed and conventional railway systems) were tackled in Directive 2004/50/EC which amended Directives 96/48 and 2001/16. The update was given in 2008 via Directive 2008/57/EC (so called "Interoperability Directive" in the context of so-called Cross-acceptance Package), which harmonized and clarified the interoperability requirements.
- The domestic freight traffic was opened for competition starting from 1st January 2007, which was achieved via Directive 2004/51/EC.
- The European Railway Agency (ERA) was constituted by Regulation (EC) 881/2004 (amended by Regulation 1335/2008). ERA's main task is to provide the Member States and the Commission technical assistance in the fields of railway safety and interoperability (ERA, 2012)
- Finally, the Second Railway Package mandated the European Commission to launch negotiations on the accession of the European Community to the Intergovernmental Organization for International Carriage by Rail (COTIF). These negotiations were finalised in 2011 and the Accession Treaty entered into force on 1st July 2011.

The European Commission adopted *the Third Railway Package* measures on 26th September 2007. The main achievement was to open up the international passenger services to competition in the entire European Union by 2010. The Package included (ORR, 2012a):

- The step towards deregulating the international passenger services from 1st January 2010 was taken by Directive 2007/58/EC, which mainly concentrated on allocation of railway infrastructure capacity and levying infrastructure charges.
- The engine drivers' certification operating locomotives and trains on the community's railway system was covered in Directive 2007/59/EC. It

introduced the conditions and procedures for the certification of engine drivers.

- Finally, rail passengers' rights and obligations were handled in Regulation 1371/2007. The Regulation ensured basic rights for passengers, including factors concerning insurance, ticketing and reduced mobility.

Among the latest actions related to railway regulation is the recast of the First Railway Package i.e. so-called proposal for a Directive on the Single European Railway Area. The European Commission presented its proposal to amend the First Railway Package on 17th September 2010. The objective of the recast-proposal is to simplify and consolidate the rules by merging three directives into a single text. Furthermore, the target is to clarify existing provisions and clarify the key problem areas which have been noted in the market during the last decade. The proposal aims at ensuring an equal access to rail-related services also in such a case when these services are provided by an incumbent railway undertaking having a dominant market position. In such a case the proposal aims at separation of these services from transport operations, at least in organizational and decision-making terms. Moreover, the proposal aims at enhancing the role of the national regulatory bodies in their market surveillance role. The Council and the European Parliament are currently trying to find a compromise on the recast-proposal. (ORR, 2012a) The European Commission has already announced that it should present a proposal for so-called Fourth Railway Package. This legislative proposal will contain amongst others an obligation to open the domestic passenger transport for competition. The proposal will be presented probably in early 2013 after the European Parliament and Council have agreed on the recast-proposal and the Directive is adopted.

In addition to Directives, European Commission has launched several White Papers. According to Europa Glossary (2012), "*White Papers are documents containing proposals for Community action in a specific area. When a White Paper is received by the Council, it can lead to an action programme for the Union in the area concerned*". In railway sector several important White Papers have been launched during the last decades. White Paper "A Strategy for Revitalizing the Community's Railways" was introduced in 1996 to complete and reinforce the progress which was started with Directive 91/440. In the White Paper was stated that Member States should free railways from debts and regularize the financial issues according to rules of Community. Also the separation of infrastructure management from railway operations was emphasized, as well as the importance of having public service obligations by contracts between railway undertakings and governments. The main objective was the harmonization of technical standards to achieve interoperability in European rail networks, as well as allowing workforce to retrain and restructure. Second White Paper "European Transport Policy for 2010: Time to Decide" was submitted in 2001. The target of the document was to promote the shift from road to rail. Additionally, enlargement of European Union in the form of new member states unfolded challenges to railway market as large scale investment requirements were needed in order to reach the international standards. (Quinet and Vickerman, 2004; Summary of First Railway Package, 2010)

Despite of the deregulation of the European Union legislation, the level of competition varies between the EU Member States. Although the railway freight market was deregulated only on 1st January 2007, some countries liberalized the freight market already earlier. Among the first countries were the United Kingdom,

Sweden and Germany (see for example Quinet and Vickerman, 2004), which opened market for competition already in 1990s. The new era of German rail market started in December 1993, when the Deutsche Bahn AG (DB) was established. In order to define the new regulative framework, the access to DB's infrastructure was opened for other railway undertakings. Germany introduced so called "internal market structure", which consisted of a holding company and five independent public limited companies (Geyer and Davies, 2000). Furthermore, federal states were stated to be responsible for regional passenger services starting from 1996. The passenger market was divided into two, regional and long-distance services. In addition to differences in operating areas' length, regional service receives state-subsidies in order to cover operating costs. At the same time long-distance services were taken care of without public funding and competition was resting on open access. (Séguret, 2009) Due to different forms of regulation in regional and long-distance services, DB has mainly competitors in regional traffic. Recently there have been discussions to privatize DB and divide its functions to three: Passenger traffic, freight traffic and infrastructure together with logistics. In this model infrastructure would still remain under state's possession. Due to economic recession the privatization has been postponed. (Ministry of Transport and Communications, 2010) However, the private railway undertakings are doing rather well in Germany. In 2010 the private companies accounted for 18.9 per cent of total operating performance of DB Netze, compared to 17 per cent share in 2009. When concentrating on passenger transport, the performance has increased by 27.5 per cent since the 1994 rail reform.

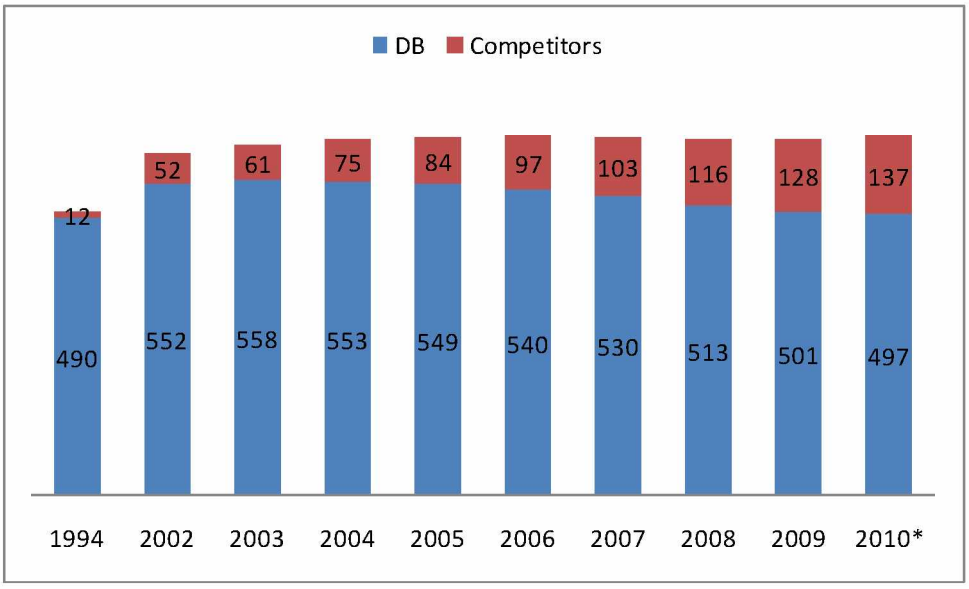


Figure 3 *Contracted train services in the regional passenger rail market in Germany, million train-kilometres (Ksoll, 2011)*

As illustrated in figure 3, the share of private railway undertakings has strongly sharpened in the German regional passenger rail market. In 2010, the share of train-kilometres handled by private railway undertakings increased seven per cent, meaning the market share of private undertakings was 21.6 per cent in 2010. The forecast for the coming years' estimates that the competition will remain dynamic, and the share of private railway undertakings' train-kilometres in regional traffic is estimated to grow (2011 to 24.1 per cent, 2012 to 25.3 per cent and 2013 to 26.7 per cent). (KCW, 2011; Ksoll, 2011) The second largest rail network in Europe belongs to

France. The major part of operations is still today done by the French national railway company (SNCF), which was reformed to separate infrastructure management from freight and passenger operations. The public agency Rèseau Ferré de France (RFF) was established in 1997 to take over the infrastructure management (Quinet and Vickerman, 2004).

Alexandersson and Hulten (2009) noted there are two types of competition in European railway market. Competition on-the-track on international lines is based on cabotage principle, and it basically means that traffic is done between EU member states and it allows picking up passengers from stations along the line. This can be done without a permission or contract with local railway undertakings. Another form of competition is on-the-track in national market. This is limitedly used for example in UK, and it is also spreading to other countries, while for example Sweden finalized the liberalization process in 2010. The European wide deregulation of passenger rail transport might be seen in near future, because the Commission is proposing that passenger rail transport networks should also be opened for competition. (Alexandersson and Hulten, 2009; Laisi and Poikolainen, 2011; EU, 2012)

Although the European railway sector has mainly confronted declines during the last years, it seems the market recovered from economic crisis in 2010. The total performance in rail freight sector (in EU-27) was estimated at 389 billion tonne-kilometres in 2010, which means 7.9 per cent increase when compared with 2009. The volumes were basically rising for majority of the Member States when comparing years 2009 and 2010. (Justen, 2012) Table 2 describes the freight volumes in European countries.

Table 2 *Rail freight transport volumes in European countries, million tonne-kilometres (DG TREN, 2000; Eurostat, 2012a; SIKA, 2009; UNECE, 2011)*

Country / year	1995	2000	2005	2006	2007	2008	2009	2010
Belgium	7 600	7 694	8 130	n/a	9 258	8 927	6 374	6 268
Bulgaria	n/a	5 538	5 163	5 396	5 241	4 693	3 145	3 064
Czech Republic	n/a	17 496	14 866	15 779	16 304	15 437	12 791	13 770
Denmark	2 000	2 025	1 976	1 892	1 779	1 866	1 700	2 239
Germany	68 800	75 884	95 420	107 007	114 615	115 652	95 834	107 317
Estonia	n/a	8 102	10 639	10 418	8 430	5 943	5 947	6 638
Ireland	600	491	303	205	129	103	79	92
Greece	300	426	613	662	835	786	552	614
Spain	10 400	11 614	11 585	11 541	11 237	10 971	7 937	9 211
France	48 100	55 448	40 701	41 190	42 623	40 548	32 130	29 965
Italy	21 700	24 995	22 761	24 151	25 285	23 831	17 791	18 616
Latvia	n/a	13 310	19 779	16 831	18 313	19 581	18 725	17 179
Lithuania	n/a	8 919	12 457	12 896	14 373	14 748	11 888	13 431
Luxembourg	500	n/a	392	441	574	279	200	n/a
Hungary	n/a	8 093	9 090	10 167	10 048	9 874	7 673	8 809
Netherlands	3 100	4 522	5 865	6 289	7 216	6 984	5 578	5 925
Austria	13 200	16 602	18 957	20 980	21 371	21 915	17 767	19 833
Poland	n/a	54 015	49 972	53 622	54 253	52 043	43 445	48 705
Portugal	2 000	2 183	2 422	2 430	2 586	2 549	2 174	2 313
Romania	n/a	16 354	16 582	15 791	15 757	15 236	11 088	12 375
Slovenia	n/a	2 596	3 245	3 373	3 603	3 520	2 817	3 421
Slovakia	n/a	11 234	9 463	9 988	9 647	9 299	6 964	8 105
Finland	9 600	10 107	9 706	11 060	10 434	10 777	8 872	9 750
Sweden	19 102	20 088	21 675	22 271	23 250	22 924	20 389	23 464
United Kingdom	13 300	18 100	21 427	21 919	21 265	21 077	19 171	18 576
Liechtenstein	n/a	n/a	17	18	18	17	10	11
Norway	n/a	2 451	3 182	3 351	3 502	3 621	3 506	3 496
Switzerland	n/a	11 080	11 677	n/a	n/a	12 265	10 565	11 074
Croatia	n/a	1 928	2 835	3 305	3 574	3 312	2 641	2 618
Turkey	n/a	9 645	9 077	9 544	9 755	10 552	10 163	11 300

As illustrated in table 2, major amount of countries confronted growth in rail freight volumes between 2009 and 2010. The largest decrease was noted in France, where the tonne-kilometres between 2009 and 2010 decreased 6.7 per cent. Regardless of decreasing figures, country still recorded third largest performance in Europe, after Germany (107 billion) and Poland (around 49 billion). The highest increase was noticed in Denmark (31.7 per cent), followed by Slovenia (21.4 per cent) and Ireland (16.6 per cent). Figure 4 presents the freight rail volumes for this study's case countries (Sweden, Denmark and the UK) and Finland.

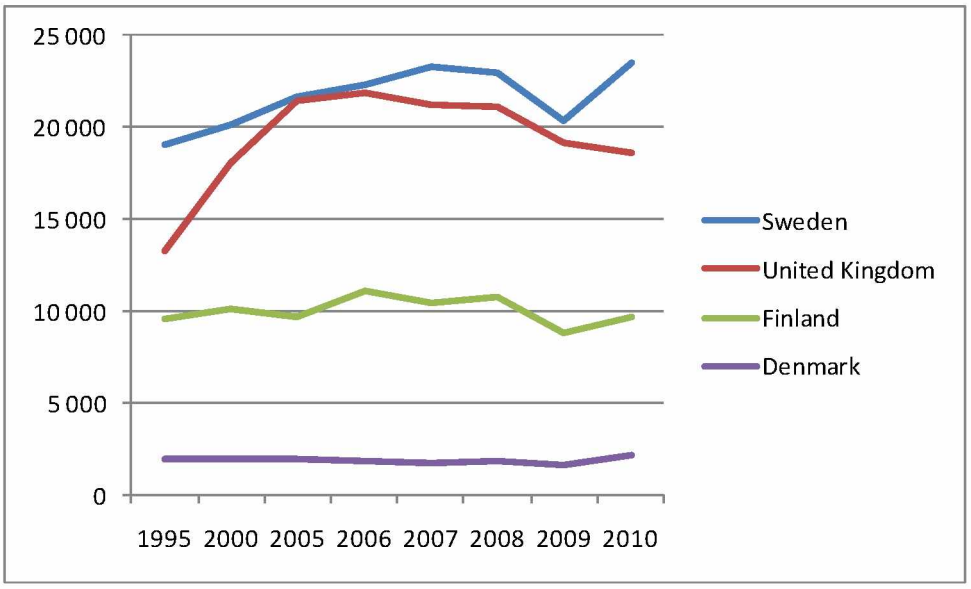


Figure 4 *Rail freight transport volumes in case countries and Finland, million tonne-kilometres (DG TREN, 2000; Eurostat, 2012a; SIKA, 2009; UNECE, 2011)*

The recession's influence on freight transport is visible in figure 4. In all countries in question the amount of railway freight decreased in 2008. Sweden, Denmark and Finland showed slight growth in 2010, but British volumes were declining. However, the trend changed in 2011. When comparing the case countries' quarterly volumes in 2010 and 2011 (see table 3), clear increase is noted in Denmark and the UK. Actually Denmark had the largest increase in whole European Union, 25 per cent during the first six months. The freight rail volumes for Sweden show short-term decline.

Table 3 *Rail freight transport volumes in Denmark, Sweden and the UK, million tonne-kilometres per quarter (Eurostat, 2012b)*

Country / Q	2010Q1	2010Q2	2010Q3	2010Q4	2011Q1	2011Q2	2011Q3	2011Q4
Denmark	501	570	562	607	655	688	645	n/a
Sweden	5 636	6 078	5 755	5 995	5 851	5 962	5 414	5 477
United Kingdom	4 687	4 516	4 752	4 577	5 341	5 137	5 259	n/a

When contemplating the rail passenger transport volumes in the European Union for the recent years, it is evident that although the trend was decreasing during 2007-2009, the volumes have started to increase in several European Member States. The largest figures were achieved in France (89 billion) and Germany (83 billion) (see table 4 below).

Table 4 *Rail passenger transport volumes in Europe, million passenger-kilometres (Eurostat, 2012a)*

GEO/TIME	1995	2000	2005	2006	2007	2008	2009	2010
Belgium	6 800	7 755	8 510	8 964	9 403	10 139	10 237	9 849
Bulgaria	n/a	3 472	2 389	2 411	2 404	2 317	2 138	2 090
Czech Republic	n/a	7 300	6 667	6 922	6 898	6 773	6 472	6 559
Denmark	5 000	5 327	5 961	6 097	6 163	6 267	6 161	6 341
Germany	63 500	74 015	74 944	78 735	79 098	82 428	81 206	82 837
Estonia	n/a	261	248	257	274	274	249	247
Ireland	1 300	1 389	1 781	1 872	2 007	1 976	1 683	n/a
Greece	1 600	1 886	1 854	1 811	1 930	1 657	1 467	1 383
Spain	16 000	n/a	21 151	21 620	21 362	23 453	23 055	22 348
France	55 300	69 571	76 884	79 809	81 961	86 516	88 610	n/a
Italy	52 400	n/a	50 088	50 185	49 780	49 524	48 124	47 172
Latvia	n/a	715	889	986	975	941	748	741
Lithuania	n/a	611	280	268	246	258	231	244
Luxembourg	300	n/a	267	298	316	345	n/a	347
Hungary	n/a	9 693	9 714	9 524	8 752	8 291	8 004	7 653
Netherlands	14 000	n/a	n/a	15 889	16 325	n/a	n/a	n/a
Austria	9 800	8 206	8 685	8 907	9 167	10 365	10 184	10 263
Poland	n/a	n/a	17 882	18 240	19 524	19 762	18 128	17 485
Portugal	4 800	3 834	3 809	3 876	3 987	4 213	4 213	4 111
Romania	n/a	11 632	7 985	8 092	7 476	6 958	6 128	5 437
Slovenia	n/a	705	716	724	740	765	773	729
Slovakia	n/a	2 870	2 182	2 213	2 165	2 296	2 264	2 309
Finland	3 200	3 405	3 478	3 540	3 778	4 052	3 876	3 959
Sweden	6 600	8 243	8 910	9 617	10 261	11 146	11 321	11 219
United Kingdom	30 200	38 421	44 642	47 297	50 474	53 002	52 765	55 831
Liechtenstein	n/a		1	1	1	1	1	1
Norway	n/a	2 520	2 723	2 833	2 958	3 123	3 080	3 186
Switzerland	n/a	12 620	16 144	n/a	n/a	17 951	18 511	19 093
Croatia	n/a	1 252	1 227	1 322	1 573	1 769	1 802	1 711
Turkey	n/a	5 832	5 036	5 277	5 553	5 097	5 374	5 491

Eurostat (2011) has evaluated the length of journeys which each European has travelled. In 2007, every European travelled approximately 798 passenger kilometres in EU-27 area. When comparing the figures between 2004 and 2009, out of all Member States 15 were able to increase the use of rail transport per inhabitant. Highest increases were noted in Estonia (30 per cent), Luxembourg (28 per cent) and Sweden (27 per cent). At the same time the rail transport utilization per inhabitant fell in Romania (28 per cent) and Hungary (22 per cent). The average distance travelled by rail per person was highest in France (1377 km), followed by Sweden (1225 km), Austria (1219 km) and Denmark (1118 km). On the contrary, lowest figures were noted in Lithuania (69 km) and Greece (148 km). (Eurostat, 2011)

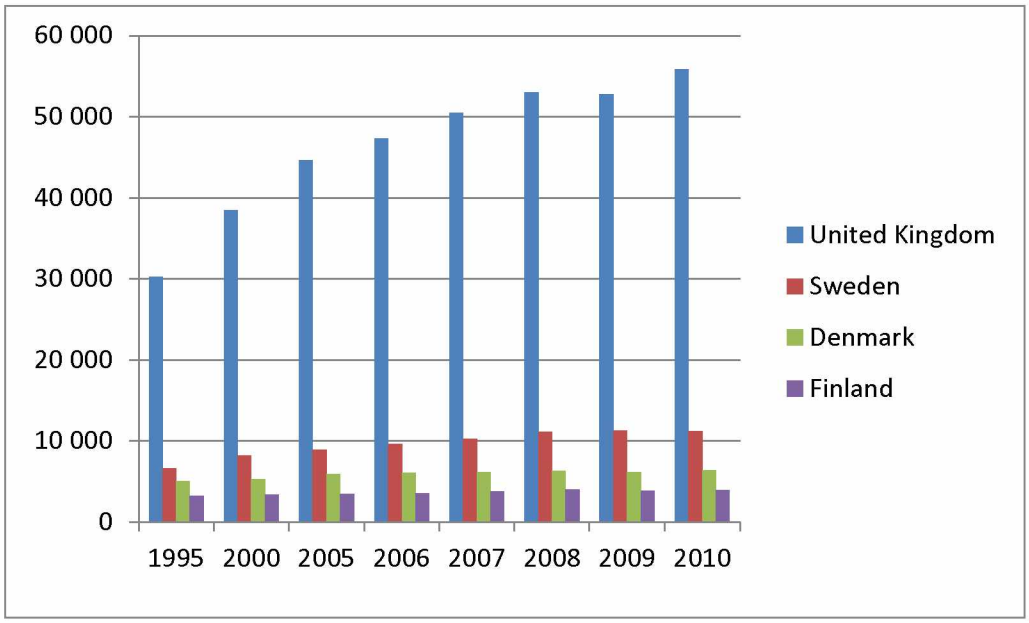
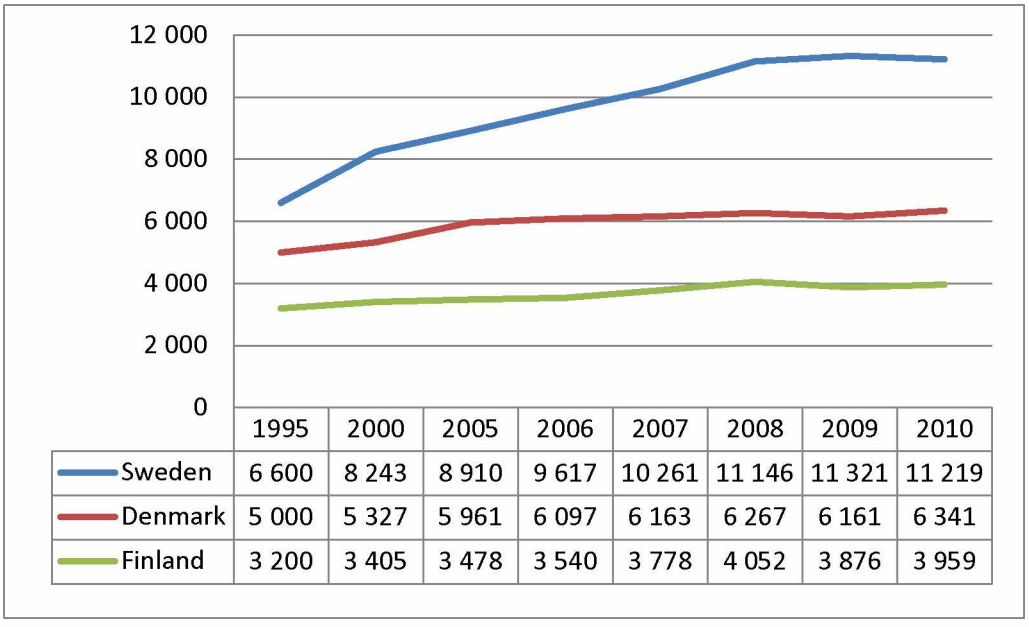


Figure 5 *Rail passenger transport volumes in case countries and Finland, million passenger-kilometres (Eurostat, 2012a)*

Figure 5 presents the rail passenger transport volumes in Sweden, Denmark, the UK and Finland. Superior volumes were recorded in the UK, where in 2010 were done almost 56 billion passenger kilometres. With the exception of year 2009, the British passenger-kilometres have been increasing. This might be partly due to deregulated market, which improved the service and decreased the ticket prices. Figure 6 below presents the situation slightly more precise in Sweden, Denmark and Finland.



	1995	2000	2005	2006	2007	2008	2009	2010
Sweden	6 600	8 243	8 910	9 617	10 261	11 146	11 321	11 219
Denmark	5 000	5 327	5 961	6 097	6 163	6 267	6 161	6 341
Finland	3 200	3 405	3 478	3 540	3 778	4 052	3 876	3 959

Figure 6 *Rail passenger transport volumes in Sweden, Denmark and Finland, million passenger-kilometres (Eurostat, 2012a)*

When comparing the Northern European countries, the most significant increase has been noted in Sweden. Also the Danish market has confronted growth in passenger-kilometres. The reason behind might be the fact that new railway undertakings have

entered the market. Although Finnish market has slightly increased, the growth has not been as noticeable as in Sweden and Denmark.

2.2 Sweden

Although the regulatory reforms in the Swedish railway sector is not unique when comparing to general trend of industry progress in Sweden, it is recognized to present very early case of opening up the market to increased level of competition (Alexandersson, 2010). The railway market deregulation was initiated via the Transport Policy Act in 1988. It imposed the Directive 91/440, which objective was to improve the European Union area's common railway structure. In Swedish market environment this meant that the responsibility of the County Public Transport Authorities (CPTAs) was extended from bus to railway services. The process started in CPTA meeting in 1989, when an official suggested that BK Buss should place a bid in the upcoming tendering process for the regional railway services. The bid was realized by company called BK Tåg, which won the contract and entered the Swedish railway market in 1990. The company broke the SJ's monopoly and became the first private railway undertaking in 40 years. In early 1991 the Ministry of Transport professed that more railway undertakings would stimulate the railway sector to employ its resources in a more efficient manner. There was a perceived fear among politicians that SJ would become way too powerful in the Swedish transport market. However, it took five years before the next private railway undertaking entered the market in 1995. The inter-regional markets were tendered already in 1992 and the assignments of allocation of track capacity and train traffic control were shifted from SJ to Banverket in 1996. At the same time other common facilities were made available for private railway undertakings under commercial but non-discriminating ways. Regardless of these actions, the breakthrough happened only in 2000. The progression continued in 2007 when SJ lost its monopoly in night and charter trains. The market deregulation was taken even further on 1st October 2010, when railway undertakings having registered office in EES or Switzerland were justified to operate passenger rail services in Swedish rail network. The final step was taken in 2010, when the passenger market was totally opened for competition. (Alexandersson, 2010; Alexandersson and Hulten, 2006; Alexandersson and Hulten, 2008; Alexandersson and Hulten, 2009; the Network Statement, 2012)

The first private railway undertakings entered the Swedish railway freight market in early 1990s. Mainly these were small-scale freight railway undertakings working as sub-contractors to SJ. In 1993 the state-owned ore mining company LKAB became the first company to get own operating license to Swedish rail network. LKAB established a subsidiary called MTAB (Malmtrafik i Kiruna AB) in 1996, and it took over the rail transport activities from SJ. (Alexandersson and Hulten, 2008) Further changes have been done in the company in 2012, when MTAB's name was changed to LKAB Malmtrafik (LKAB, 2012). Overall the deregulation process in rail freight sector was introduced in 1996 (Alexandersson, 2010; Jensen and Stelling, 2006). The decision was done in order to get rail freight sector more customer-oriented and increase its modal share. The Grandfather rights -clause (meaning the railway undertaking had a right of precedence to a timetable position it had used before) was included to protect the competitiveness of freight services that might rest upon on scale economies, but nevertheless new railway undertakings were able to win important contracts in direct competition with the incumbent, SJ. The progression

evolved even further in 1998, when a new Transport Policy Bill was introduced. The main objective was to create more equal terms for competing modes of transport, wherefore track access fees were decreased. In order to facilitate the market entry process, some railway lines which had remained at SJ's possession were transferred to Banverket. A new national authority, Rikstrafiken, was established. The authority became responsible for competitive tendering of unprofitable inter-regional services. (Alexandersson, 2010)

When considering the deregulation process in the Swedish market environment, it has been rather cost effective in terms of reducing costs in both infrastructure management and operational services. This is mainly due to competitive pressure between the railway undertakings. Although the vertical separation of infrastructure management and traffic operations increased some deregulation related costs (for example restructuring and transactions), this has been covered with the net-effect achieved via competition. Technology, intermodal competition and overall the political pressure explained about half of the cost improvements (when having observing periods of 1970-1988 and 1989-1999), but generally these cannot be strictly explained by deregulation. (Jensen and Stelling, 2006)

Swedish rail network's length is 13 642 km, of which 11 152 km is electrified. (Trafikverket, 2012) When compared to other North European countries Swedish rail network is rather long (for example the rail network in Denmark is 2 132 km and in Finland 5 944 km (Banedanmark, 2012a; Finnish Transport Agency, 2012). The longer rail network gives Sweden a competitive edge both in passenger and freight rail sectors. This can be noted in passenger and cargo volumes (see tables 5 and 6).

Table 5 *Rail freight transport volumes in Sweden, million tonnes and million tonne-kilometres (Trafikanalys, 2011)*

Tonnes (million)					
	Quarter 1	**Quarter 2**	**Quarter 3**	**Quarter 4**	**Total**
2007	16 898	16 909	16 670	17 332	67 809
2008	16 925	16 960	16 707	15 039	65 631
2009	11 779	12 962	14 105	17 621	56 467
2010	16 221	17 299	17 188	17 621	68 329
2011	17 102	17 586	16 492	16 823	68 003
Tonne km (million)					
	Quarter 1	**Quarter 2**	**Quarter 3**	**Quarter 4**	**Total**
2007	5 812	5 897	5 488	6 053	23 250
2008	6 062	6 138	5 667	5 058	22 925
2009	4 538	4 973	4 963	5 915	20 389
2010	5 636	6 078	5 755	5 995	23 464
2011	5 851	5 962	5 414	5 477	22 704

The economic recession in 2009 was highly notable in freight volumes, as both the tonnes and tonne-kilometres decreased dramatically. Otherwise the volumes have stayed in rather same level. The increase in volumes is more salient in passenger sector, which has a growing tendency. Although the passenger kilometres confronted

a slight decrease in 2010, the number of passengers has been increasing annually (see table 6).

Table 6 *Rail passenger transport volumes in Sweden, million journeys and million passenger-kilometres (Trafikanalys, 2011)*

Passenger km (million)					
	Quarter 1	**Quarter 2**	**Quarter 3**	**Quarter 4**	**Total**
2007	42	41	39	47	169
2008	45	45	42	47	179
2009	45	45	42	47	179
2010	44	45	43	48	180
2011	46	47	46	49	188
Journeys (million)					
	Quarter 1	**Quarter 2**	**Quarter 3**	**Quarter 4**	**Total**
2007	2 485	2 592	2 467	2 716	10 260
2008	2 699	2 816	2 704	2 927	11 146
2009	2 809	2 838	2 722	2 953	11 322
2010	2 681	2 858	2 754	2 926	11 219
2011	2 743	2 885	2 836	2 970	11 434

Since opening the market for competition, both freight and passenger markets have attracted several new railway undertakings. Table 7 presents the railway undertakings who have license to operate in Swedish rail network in 2012. (ERADIS, 2012)

Table 7 *Companies having the license to operate in Swedish rail network in 2012 (ERADIS, 2012)*

Railway Undertaking	Passenger / Freight
Alstom Transport AB	Freight
Arriva Östgötapendeln	Passenger
Arriva Tåg AB	Passenger
Baneservice Skandinavia AB	Freight
Bombardier Transportation Sweden AB	Passenger
Botniatåg AB	Passenger
CFL cargo Sverige AB	Freight
CQ Correct AB	Freight
DSB Sverige AB	Passenger
EuroMaint Rail AB	Freight
Green Cargo AB	Freight
Hector Rail AB	Pass/Freight
Infranord AB	Freight
Inlandsbanan AB	Pass/Freight
Inlandståget AB	Pass/Freight
ISS TraffiCare AB	Freight
LKAB Malmtrafik	Freight
Nordic Haulage AB	Pass/Freight
Nordiska Tåg AB	Freight
Railcare Tåg AB	Freight
Rushrail AB	Freight
SJ AB	Passenger
Skandinaviska Jernbanor AB	Passenger
Stena Recycling AB	Freight
Stockholmståg KB	Passenger
Strukton Rail AB	Freight
Svensk Tågkraft AB	Freight
Svenska Tågkompaniet AB	Passenger
SWT Swedtrac Trafik AB	Pass/Freight
Tågåkeriet i Bergslagen AB	Freight
Tågfrakt i Sverige AB	Freight
TMRail AB	Freight
TX Logistik AB	Freight
VÄTE Consulting AB	Freight
Veolia Transport Sverige AB	Passenger

There are 35 railway undertakings that have the license to operate in Swedish rail network. Several railway undertakings are offering freight services, but during last few years also the number of passenger rail companies has increased due to deregulation. The tightened competition in freight transport has led to changes, for example

Peterson Rail went to bankruptcy in 2012 and TGOJ merged into Green Cargo in 2010/2011 (Green Cargo, 2011; Peterson Rail, 2012)

2.3 Denmark

According to Rail Liberalization Index (IBM, 2011), Denmark has proceeded rather steadily in deregulating the railway market. Due to European Union regulations the freight sector is fully opened for competition, but the situation is dissimilar in passenger sector. In addition to incumbent DSB (which is divided into Copenhagen local traffic, S-tog and long-distance traffic), a group of private railway undertakings have entered the market via two types of arrangements. Four railway undertakings (Regionstog, Lokalbanen, Nordjyske Jernbaner and Midtjyske Jernbaner) are small-scale private railway undertakings operating regionally within a small operation radius. These railway undertakings also own the rail network. (Lokalbanen, 2012; Midtjyske Jernbaner, 2012; Nordjyske Jernbaner, 2012; Regionstog, 2012) Furthermore, two railway undertakings have entered the market via tendering processes. The first tender was available for bidding in 2002; Arriva won the eight year long contract and started the operations in 2003. Due to great work in offering the passenger transport, the contract was re-won in 2009, and the current settlement runs till 2018. (Arriva, 2012) The second tender was out in 2008, the contract was won by DSBFirst which started the operations in 2009. Company confronted financial difficulties and the operations were reorganized in 2011, when DSB Øresund became responsible for the traffic. (DSB Øresund, 2012) Although both tender processes confronted some challenges, report of the Ministry of Transport and Communications (2010) noted market entry via tendering process is overall positive way to enter a new market.

The length of the Danish rail network is 2 132 km, which is greatly managed by the Banedanmark, Rail Net Denmark (Banedanmark, 2012a). To other rail networks belong regional railways which are operating 514 kilometres and Copenhagen metro, which is 21 kilometres long (Statistics Denmark, 2011). Only a small portion of Danish rail network is electrified. In Denmark the figure is approximately 25 per cent, while other North European countries have greater numbers (For example Finland 51.8 per cent and Sweden around 82 per cent). (Finnish Transport Agency, Trafikverket, 2012) However, this does not influence on the transport volumes, which have been increasing (see tables 8 and 9).

Table 8 *Rail freight transport volumes in Denmark, thousand tonnes and million tonne-kilometres (Statistics Denmark, 2012)*

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
1000 tonnes	All types of transport	8268	7520	7639	7998	8167	7706	7477	6901	7198	6163	8121
	National transport	2443	1939	1724	1779	2010	1865	1409	778	570	527	758
	International transport	3247	2784	3001	3165	2986	2697	2757	2443	2073	1395	1378
	From Denmark	1252	962	1016	1155	1069	1003	899	778	596	440	470
	To Denmark	1995	1822	1984	2010	1917	1694	1858	1665	1477	955	908
	Transit Denmark	2578	2797	2914	3055	3171	3144	3311	3680	4555	4241	5985
Million tonne-km	All types of transport	2057	1987	1941	2013	2169	1976	1893	1779	1867	1698	2240
	National transport	488	388	354	372	520	442	260	146	122	123	167
	International transport	699	656	601	608	575	468	518	417	359	241	207
	From Denmark	274	215	196	209	210	171	174	135	90	64	64
	To Denmark	425	441	406	399	365	297	344	282	268	176	143
	Transit Denmark	870	943	986	1033	1075	1066	1115	1216	1387	1335	1866

When considering the freight volumes, the market structure has confronted significant changes. Although the volumes were around the same level in 2000 and 2010, the share of transit transport has significantly increased. In 2000 its share was 31.2 per cent, while in 2010 the corresponding figure was 73.7 per cent (thousand tonnes). The reason might be the Öresund Bridge, which was opened for traffic in 2000. Generally the rail freight transport volumes between 2000 and 2010 had a declining trend, but year 2010 showed growth. The tendency has been different in passenger sector (see table 9).

Table 9 *Rail passenger transport volumes in Denmark, thousand passengers and million passenger kilometres (Statistics Denmark, 2012)*

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
1000 passengers	165 700	167 032	165 285	185 989	202 100	207 477	211 073	214 340	226 250	233 029	238 447
Million passenger km	5 537	5 721	5 754	5 893	6 074	6 136	6 274	6 353	6 475	6 367	6 587

The volumes have been increasing annually. When comparing the figures of 2000 and 2010, in number of passengers the growth has been spectacular 43.9 per cent. This can be partly explained by the tendering processes and overall market development. After new railway undertakings started the operations, they have been able to attract new customers to use railway transport. Furthermore, condition of infrastructure is expected to improve in the future, as Denmark is among the first countries which have decided to equip the infrastructure with ERTMS system by 2021 (Signal, 2010).

Table 10 *Railway Undertakings having the license to operate in Danish rail network in 2012 (Banedanmark, 2012b)*

Railway Undertaking	**Passenger / Freight**
Arriva Tog A/S	Passenger
CFL Cargo Danmark ApS	Freight
DB Schenker Rail Scandinavia A/S	Freight
DSB	Passenger
DSB S-tog	Passenger
DSB Øresund A/S	Passenger
Hector Rail	Freight
Lokalbanen A/S	Passenger
Midtjyske Jernbaner A/S	Pass/Freight
Nordjyske Jernbaner A/S	Passenger
RailCare Tåg AB	Freight
Regionstog A/S	Passenger
SJ	Passenger

Table 10 presents the railway undertakings having the licence to operate in Danish network. Five railway undertakings are offering services in freight sector, while passenger sector has attracted more railway undertakings. As mentioned earlier, in addition to the incumbent DSB seven railway undertakings are operating in the market. Arriva and DSB Øresund entered the market via tender processes, and Lokalbanen, Midtjyske Jernbaner, Nordjyske Jernbaner and Regionstog are regional railway undertakings owning also the infrastructure. In addition, the Swedish incumbent SJ has small-scale traffic in Denmark, as it operates the trains between Stockholm, Sweden and Copenhagen, Denmark. (Banedanmark, 2012b)

2.4 The United Kingdom

The UK has the world's oldest railway system. Originally it consisted of local rail links operated by small private railway undertakings. In 1914 the length of British network was 32 000 km and the market was operated by 120 competing railway undertakings. In 1923 the British government decided to combine the operators into four main groups: The Great Western Railway, the London and North Eastern Railway, the London, Midland and Scottish Railway and the Southern Railway. The sector confronted another change in 1947 when the Transport Act was introduced. It nationalized the British railways, and became known as British Rail since 1948. During the early years the company was controlled by a special transport commission, but it was replaced in 1963 by the British Rail Board. Among the main objectives of the Board was the development of main lines and discharging the unprofitable lines. Due to these rearrangements the network decreased from 28 000 km to 17 000 km, and the amount of personnel was almost halved. (Alexandersson, 2010)

During early 1980s the British Rail confronted financial problems. In 1982 the Serpell committee's report stated some large-scale closures were needed in order to reduce the need for subsidies to British Rail. However, partly due to political reasons this recommendation was brushed aside. As some actions were needed, British Rail was reorganized into several business sectors and was later commercialized. During this process several activities which did not directly focus on railway sector (e.g. British Transport Hotels) were divested. Although these actions improved the British Rail's productivity, starting from 1983 several groups highlighted the best option would be to privatize the railway industry. In order to get familiarized how other countries had proceeded with the situation, special attention was paid to deregulation of the US railway industry. Furthermore, a group of people (including representatives from both Department for Transport as well as British Rail) visited Sweden in 1991-1992, in order to learn from Swedish experiences (Sweden got the first entrant BK Tåg in 1990; see further information in Chapter 2.3). In July 1992 a privatization plan was introduced, which led to the White Paper called "*New opportunities for the Railways: The Privatization of the British Rail*". Although the White Paper got a lot of criticism, mainly because it was said to be too short and lacking important information (e.g. how and when the proposals were to be realized), it was followed by several consultation documents made by the Department of Transport which untangled the market conditions. This led to Railways Act in 1993, which set the basis for the privatization of British Rail. The process began in April 1994. Based on the Railways Act British Rail was divided into more than 80 companies. The main objective was to create competition in as many segments of the sector as possible. In regulatory side the Office of Rail Regulator (ORR) was established, having the general responsibility of managing the different actors followed the given rules. Railtrack was established to own, maintain and develop the British rail infrastructure. In the first place the idea was to keep Railtrack in public possession, but it was privatized in 1996. Freight sector was opened for competition and in February 1996, British Rail's bulk freight operations were sold to North and South Railways, later called English, Welsh and Scottish Railway (EWS). In 2007 Deutsche Bahn bought EWS and in January 2009 it was renamed as DB Schenker. Passenger operations were rearranged into 25 separate units, and further revised into Train Operating Companies (TOCs). Few at a time the TOCs were franchised via tendering processes. Newly created Office of Passenger Rail Franchising (OPRAF) organized the tendering procedures and the process was completed in March 1997. The market confronted a very competitive bidding process in 1995-1997; for each franchise was received 5-10 serious bids. Finally, 11 separate organizations entered the British railway market via winning franchises in tenders. Among the most successful ones were companies having background in bus transport (e.g. Stagecoach, National Express and First Bus). National Express won five franchises, while the biggest market share, 16 per cent of ticket revenues was gained by Connex. (Alexandersson, 2010; Fowkes and Nash, 2004; Knowles, 1998; ORR, 2011)

The deregulation process was finalized in April 1997. Office of Passenger Rail Franchising was transformed into the new Strategic Rail Authority in 2001 (Holvad et al., 2003). The Authority re-franchised the TOCs' operations and extended the agreements from seven years to 20 years. In return, TOCs got involved in infrastructure investments. Behind the idea was the fact that Railtrack was lacking possibilities to invest enough on its own, and new model was noted to facilitate the financing of the major infrastructural improvements from range of sources. On the other hand, Railtrack would buy the assets once those have been completed. (Nash

and Smith, 2006) However, due to several reasons (e.g. increasing number of accidents and poor train accuracy), the things did not proceed as planned, and finally the Hatfield accident in 2000 started a series of incidents which inflicted the collapse of Railtrack in 2002. Network Rail took over the operating the British rail infrastructure in October 2002, having three main objectives: 1) to improve the safety of railway industry and restore public confidence, 2) to improve the punctuality (at that time around every fourth train was late, and 3) to bring costs under control. In 2002 the British Government decided to introduce a 10 year plan, including support of 34 billion pounds to modernize the railway system. (Alexandersson, 2010; Hilmola and Szekely, 2006; Network Rail, 2012)

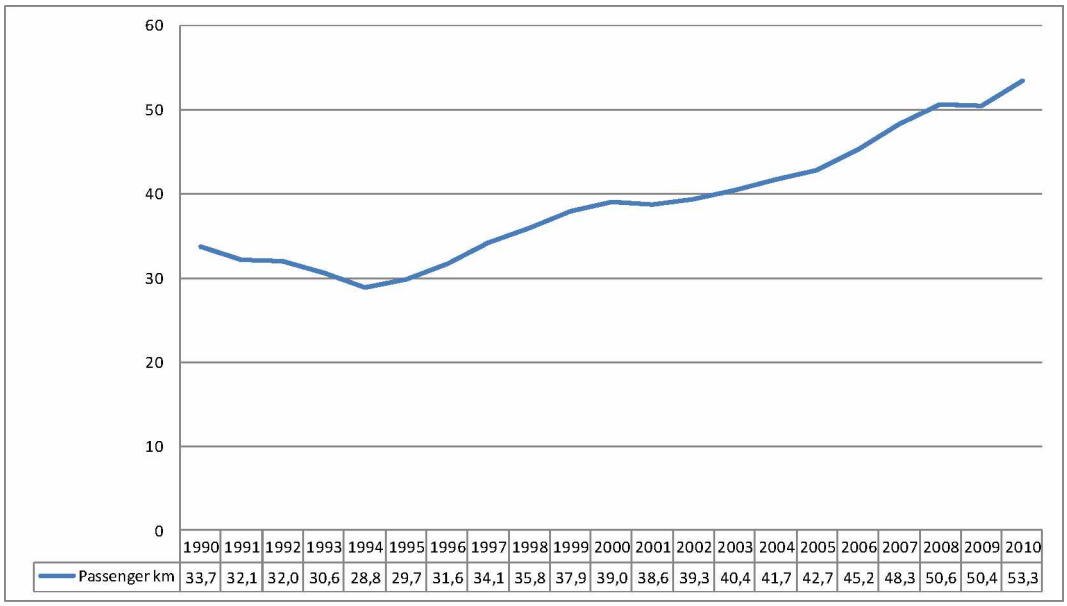
Today the market has seven freight operating companies, the largest ones are DB Schenker, Freightliner (formerly British Rail's container business), Direct Rail Services (DRS) and First GB Railfreight. In passenger sector, there are 19 train operating companies offering services in the UK (see table 11 below). (ORR, 2011)

Table 11 *Transport Operating Companies in the UK, million passenger journeys and operated route kilometres (ORR, 2011)*

TOC	Passenger journeys	Operated route kms
Arriva Trains Wales	27,8	1840,8
c2c	35,3	129,6
Chiltern Railways	18,6	341,2
Cross Country	31,3	2661,9
East Coast	18,5	1429,1
East Midlands Trains	22,7	1549,8
First Capital Connect	96,0	500,9
First Great Western	90,6	2090,5
First Scotrail	78,3	3065,8
First Transpennine Express	23,8	1250,5
London Midland	56,6	861,0
London Overground	53,6	124,0
Merseyrail	44,9	120,7
National Express East Anglia	115,0	1001,0
Northern	86,8	2745,5
Southeastern	162,3	748,3
Southern	166,0	666,3
South West Trains	202,6	944,7
Virgin Trains	28,9	1190,9

Table 11 describes the number of passenger journeys (millions) and operated route kilometres by train operating company. In 2010-2011 South West Trains had the greatest amount of passenger journeys, 202.6 million. This can be explained by the fact that South West Trains operates in South and South West England, including also London suburbs. (South West Trains, 2012) Northern has the most extensive route network, 2745.5 kilometres. The company operates in North England. (Northern, 2012) TOCs are based on franchising contracts with increasing amount of economic

incentives. Earlier was stated that time after British Rail lead to decline in services as the condition of rail network deteriorated and capacity increases were not possible. Although the volumes were increasing, the bad condition of rail infrastructure created significant problems. (Ministry of Transport and Communications, 2010) However, a lot has changed since Railtrack time. From 2005 onwards Network Rail took responsibility for planning for the future and introduced the Route Utilization Strategies, which set out the future strategies for network. Rail had become the safest mode of transport and the costs of running railway were reduced by 28 per cent. Currently British railway market is living its best times. Number of journeys has significantly increased, and although network is only half of the size it used to be before the 1960s, more trains are running daily than ever before. The development can be noted in figure 7. (ORR, 2011)



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Passenger km	33,7	32,1	32,0	30,6	28,8	29,7	31,6	34,1	35,8	37,9	39,0	38,6	39,3	40,4	41,7	42,7	45,2	48,3	50,6	50,4	53,3

Figure 7 Rail passenger kilometres, billions (ORR, 2011)

The British railway market has strong concentration on passenger transport. Overall the freight sector, in spite of transport mode, has confronted decline. When comparing the volumes between 2000 and 2009, the trend can be easily noted. During these 10 years the year 2009 is the poorest one, all transport modes transported total 221.5 billion tonne net kilometres while the corresponding figure for the peak year 2005 was 256.5 billion tonne net kilometres. Although also railway freight volumes have declined, railway sector has been able to attract some new cargoes to rail as the percentual amount of goods transported by rail has slightly increased (see table 12).

Table 12 *Freight moved by transport mode in 2000-2009 in the UK, billion tonne net kilometres (ORR, 2011)*

Transport mode	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Road	159,4	158,5	159,4	161,7	162,5	163,4	166,7	173,1	163,5	143,5
Rail	18,2	19,2	18,9	18,7	20,1	21,4	21,9	21,3	21,1	19,2
Pipeline	11,4	11,5	10,9	10,5	10,7	10,8	10,8	10,2	10,2	10,2
Water	67,4	58,8	67,2	60,9	59,4	60,9	51,8	50,8	49,7	48,6
Total	**256,4**	**248,0**	**256,4**	**251,8**	**252,7**	**256,5**	**251,2**	**255,4**	**244,4**	**221,5**
Percentage of goods moved by rail	***7,1***	***7,7***	***7,4***	***7,4***	***8,0***	***8,4***	***8,7***	***8,3***	***8,6***	***8,7***

Although the original objectives (improved safety and punctuality and reduced costs) still remain, infrastructure is confronting huge investments. Network Rail invests between 2009 and 2014 almost 12 billion pounds to improve and enlarge the railway. Among the main projects are Thameslink Programme (improving north-south traffic in London), the Reading station area redevelopment and the Strategic Freight Network, which mean more capacity on some of the busiest routes. Additionally, rail network confronts the largest expansion of the railway for more than a century. (Network Rail, 2012)

3 Rail-related Services in Railway Sector

Due to European Union directives, the railway markets have confronted several challenges during the last years. As a starting point for railway reforms has often performed the separation of accounts for infrastructure and operations, which is originating from the Directive 91/440 (see for example Alexandersson, 2009). Directive 2001/12/EC took the process even further by clarifying the official relationship between the state and the infrastructure manager, and the infrastructure manager and railway undertakings. Different countries implemented the mandate in separate ways and paces, and often the courses of actions have been divided into three options: Accounting separation (for example Austria, Belgium, Greece, Ireland), organizational separation (for example Germany and Spain) and institutional separation (for example Denmark, Finland, France, Great Britain and Sweden). (Nash and Rivera-Truvillo, 2004; van Elburg and Holvad, 2004) Alike in other European countries, before deregulating the Swedish railway market the incumbent was in charge of all rail-related services. In Sweden this meant that the Swedish State Railways (Statens Järnvägar, SJ) was responsible for organizing all rail-related actions. Figure 8 illustrates the progression of Swedish market.

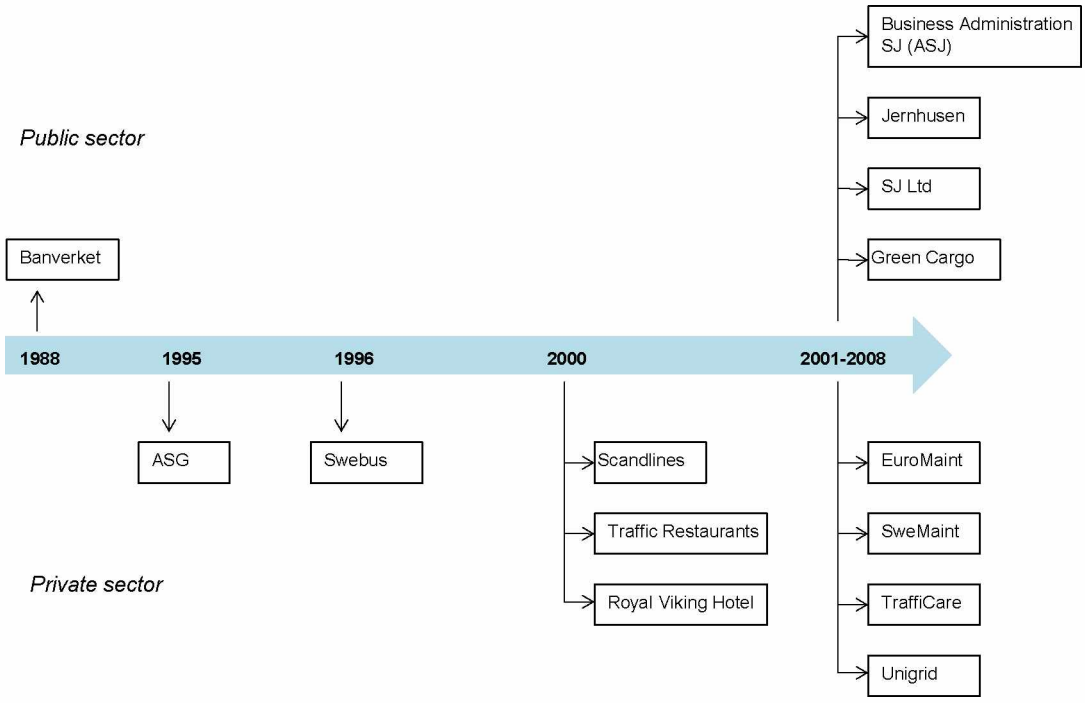


Figure 8 *Separation of business administration of SJ between 1988-2008 (adapted from Alexandersson and Hulten, 2008)*

As described in figure 8, the Swedish market structure has changed dramatically. Infrastructure management was shifted to Banverket in 1988 (since 2010 called the Swedish Transport Administration, Trafikverket). Some small-scale actions, including bus transport, hotel and restaurants were privatized between 1995 and 2000. The great change happened in 2001, when the business administration including also supporting services was separated. Affärsverket SJ (ASJ) was the only part which wasn't touched. ASJ owns great deal of the rolling stock, while other owner of rolling stock used by state-owned railway undertakings is Transitio. Railway

undertakings lease the rolling stock from either of these two companies. SJ became responsible for passenger operations and Green Cargo took over the freight activities. Jernhusen became responsible for real estate, including numerous stations, terminals and depots. Rolling stock maintenance was divided into EuroMaint and SweMaint, Trafficare became responsible for cleaning services and Unigrid for IT sector. Changes continued in 2007 when EuroMaint and Swemaint were sold to private investors. (Alexandersson and Hulten, 2006; Alexandersson and Hulten, 2009; Trafikverket, 2012) Another example is Denmark, where the infrastructure management was detached from incumbent DSB in 1997 and Rail Net Denmark (Banedanmark) was established. Rail Net Denmark became responsible for state-owned rail network. (Banedanmark, 2012a)

The liberalization process of the European railway market is developing rapidly, which means the number of railway undertakings operating in the markets is increasing. One example of private railway undertaking which entered the market during the last decade is Arriva, which entered the Danish market via tender process. Today Arriva belongs to most effective private railway undertakings in Northern Europe (see company case below).

Company case / Arriva

Arriva Denmark belongs to the Arriva–group, which is one of the largest transport service organizations in Europe, employing approximately 47 500 people and delivering annually more than 1.5 billion passenger journeys across 12 European countries. Since August 2010, Arriva has been part of Deutsche Bahn. The company has gained foothold both in bus and train passenger transport services. The company has its origins in the UK, but Denmark was the first country in mainland Europe where the company started its operations. At that time the concentration was on bus transport, but after the Danish Ministry of Transport gave a public procurement for railway lines in Jutland, Arriva decided to make a bid. They won the tender, and started the operations in January 2003 as the first private company to win a franchise to operate rail passenger services in Denmark. Arriva operated the contract till 2010, won it again and are now running the services till 2018.

Arriva does 7.9 million train kilometres annually in the middle and west of Jutland and down to a small German town, Niebüll. The total amount of passengers is around 7.5 million annually, and the number has been growing approximately 2 percent every year. In addition to growth in amount of customers, the customer satisfaction has increased since Arriva started the operations. The company is known for almost 100 percent punctuality and good customer service: In order to realize the possible problematic areas, passenger survey is organized four times a year. Customers are satisfied with the service and trains, and Arriva gets really high scores in the surveys.

Although the railway industry is known for high entry barriers, the fact that Arriva won a tender process facilitated the entry process. However, the process had some cumbersome situations due to lack of staff. Due to failed negotiations between the County Council Association and private railway organization Arriva didn't have enough time to educate their own personnel. Therefore they had to hire people from DSB and Railion. The Government realized the system had to be changed in order to educate personnel to private railway undertakings, and changed the law of educating engine drivers in 2005. Since two vocational schools, EUC Syd in Tønder and CPH West in Ishøj are giving the basic education for the drivers. When considering the other rail-related services, maintenance is done in-house in two own maintenance depots. Other actors in Danish railway market highlight that Arriva Denmark is one of the best companies in doing the maintenance in whole Europe. Although Arriva has an own ticket (discount ticket which can be used only in Arriva trains), they have joint system with DSB which assures the customers can change trains easily and without any problems. This ensures convenient and seamless journeys for the passengers.

Mr. Jan Bigom, Project Executive of Arriva Denmark is really satisfied with the Danish rail transport market. Although some areas (for example information given to passengers) could be improved, overall the market is functioning well. Cooperation with other railway undertakings as well as governmental bodies is good and smooth, which strengthens the positive attitude in railway market. One thing what could be changed in the market is to have more competition: *"We would be interested in operating more lines in Denmark. Our goal is to offer good transport services to passengers. Every passenger who transfers from using the car to using the train does also an environmental act. Arriva as a company is working to increase general awareness of the environmental credentials of public transport."*

-Mr. Jan Bigom, Arriva Denmark A/S-

In order to guarantee a well-functioning market, special attention needs to be paid to rail-related services. These include for example education, rolling stock maintenance and ticket sales. Before deregulating the markets, normal structure was to have all rail supporting services controlled and organized by one company, the incumbent. Still today in many countries the dominant state-owned railway undertaking is controlling all or a great part of passenger and freight terminals, marshalling yards, cleaning facilities, depots and refuelling points. Earlier access to these facilities as well as charges for using these was not part of the regulator's responsibilities. However, it has been proposed that the railway undertakings would be required to execute independent management and publish individual accounts for any monopoly-hold rail-related services and introduce charges for their utilizations. The regulator would be authorized to deal with matters concerning pricing of access to the facilities. (Nash, 2011)

European Parliament has also recognized something needs to be done in order to enhance railway transport and encourage new railway undertakings to enter the market. The current legal framework is not adequate to allow full access to rail-related services to new entrants under the normal market conditions (Veenman, 2008). Therefore, the European Parliament has paid a due attention to the role of the national regulatory bodies in the context of the recast-proposal (The above-mentioned proposal for a Directive of the European Parliament and of the Council on the Single European Railway Area). When the European Parliament presented its amendments on the recast-proposal at the first reading in November 2011, the Parliament emphasised the role of the national regulatory bodies in the market surveillance. Moreover, the European Parliament considered that there is a need for a European Regulatory Body in addition to the national regulatory bodies. According to the bulletin,

"Each EU Member State should ensure the independence and impartiality of the national regulatory authority so as to eradicate discriminatory practices in fixing infrastructure charges, allocating train paths and allowing access to related services (such as ticket sales, repair and maintenance installations, stations and marshalling yards, etc)." (European Parliament, 2011)

Table 13 Annex II of Directive 2001/14 (Directive 2001/14/EC, 2001; Veenman, 2008)

GROUP 1 **The minimum access package shall comprise**	**GROUP 2** **Track access to services facilities and supply of services shall comprise**
a) handling of requests for infrastructure capacity	a) use of electrical supply equipment for traction current, where available
b) the right to utilize capacity which is granted	b) refuelling facilities
c) use of running track points and junctions	c) passenger stations, their buildings and other facilities
d) train control including signalling, regulation, dispatching and the communication and provision of information on train movement	d) freight terminals e) marshalling yards f) train formation facilities g) storage sidings
e) all other information required to implement or operate the service for which capacity has been granted	h) maintenance and other technical facilities
GROUP 3 **Additional services may comprise**	**GROUP 4** **Ancillary services may comprise**
a) traction current	a) access to telecommunication network
b) pre-heating of passenger trains	b) provision of supplementary information
c) supply of fuel, shunting, and all other services provided at the access services facilities mentioned above	c) technical inspection of rolling stock
d) tailor-made contracts for: control of transport of dangerous goods, assistance in running abnormal trains	

EU legislation (Directive 2001/14, Annex II) defines four groups of rail-related services (presented in table 13). The first two groups, the minimum access package and track access to services facilities and supply of services, so called key rail services are often provided by the infrastructure manager. The legislation has also set rules for the price which railway undertakings need to pay for infrastructure manager for entering the rail infrastructure, so called access charge. This charge needs to be set at the cost which is directly resulted from operating the train service. The lower two levels, including additional and ancillary services, needs to be explicitly requested for by a railway undertaking and provided by the infrastructure manager on condition it is in a position to offer those. However, it must be noted that in practice the offer the infrastructure manager can give differs between member countries. There is a distinct discrepancy between the layers. Second layer has more room for economic assessment, less strict access obligations and more possibilities for market based pricing. (Veenman, 2008) The recast –proposal (to be adopted by the European Parliament and the Council later year 2012) aims at amending this Annex. Moreover, the recast –proposal aims at enhancing an equal access to all service categories regardless who is the service provider (i.e. whether the services are provided by an incumbent railway undertaking, infrastructure manager or any other service facility provider).

Although often the first two service groups are noted important for railway undertakings, study of EIM (2010) highlights also the services mentioned in group 3 are essential. For example, without traction a railway undertaking technically cannot run an electric train, cannot provide transport services to passengers and therefore cannot make revenues. Equitable competition can be ensured only if all railway undertakings operating in the market area have open access and right to utilize all essential services. The way how the rail-related services are organized varies substantially across the countries. For example services in marshalling and shunting yards are done by incumbent railway undertaking in e.g. in Germany (partly), Finland and Poland, while infrastructure manager is in charge of it in Sweden. In the UK, partly in Germany and Denmark other operators are responsible for these services. Services in passenger stations are provided by incumbent railway undertaking in Portugal, Poland and Finland, by infrastructure manager in the UK (major stations), Denmark and Sweden (management of stops and platforms), while the responsibility is partly given to other operators in the UK. Finally, the freight terminals and related services are under incumbent railway undertaking for example in Finland, France and Poland, those are managed by infrastructure manager in Italy and Spain, and by railway undertakings in the UK, Denmark and Sweden. (EIM, 2010)

3.1 Education

Deregulation and harmonization of the railway sectors have affected on the needed workforce to ensure the competence of European railways. In order to guarantee the education market is functioning similarly in all member states, the European Union has introduced some actions in order to harmonize the rail education around Europe. Directive 2007/59/EC, launched on 23rd October 2007 concentrated on the certification system of engine drivers on the European rail network. The objective was to have a similar license and a harmonized complementary certificate in the European Union. Directive is realized in three stages, and all engine drivers should have equal licenses and certificates latest in October 2018. In order to proceed as planned, great pressure is on over 100 educational institutions offering rail education in Europe. Based on the figures presented in Rail Training Study 2020 (Danish Technological Institute et al., 2007), the division to governmentally and privately-owned schools is 50/50. In addition to basic education organized in educational institutions, railway undertakings organize some education, mainly including additional courses to their own personnel. Approximately 11 000 engine drivers and 20 000 other rail-related staff members are educated annually in European training centres. European railway sector employs over 900 000 people. The recession has declined the needed number of employees, but the situation might change in future as the number of retiring railway workers is increasing. Main challenges in educational market are to find qualified trainers who prefer to work in teaching rather than operations. In addition, educational institutions need to pay special attention to EU's harmonization plans and overall the regulations. The market is changing rather rapidly, which creates pressure also on education. (Danish Technological Institute et al., 2007; Directive 2007/59/EC, 2007; European Union, 2012)

Since the Directive two Commission statements related to railway market education have been introduced. Commission regulation No. 36/2010 given on 3rd December 2009 set out the Community models for the train driving licences, complementary certificates, certified copies of complementary certificates and application forms for

the train driving licences as stated in Directive 2007/59/EC. Furthermore, Commission Decision 2010/17/EC launched on 29th October 2009 concentrates on the adoption of basic parameters for registers of train driving licences and complementary certificates provided under Directive 2007/59/EC. (Commission Decision 2010/17/EC; Commission Regulation No. 36/2010; Directive 2007/59/EC)

The process for obtaining the license and certification includes several specific requirements. Firstly, license identifies the driver and the authority responsible for issuing this certain license, in addition to license duration of validity. When applying for the license, the applicant needs to pass in an application, which covers various requirements, including for example applicant's medical state (not only physical but also psychological health), education and professional competence. The certificate guarantees the holder has received adequate training under railway undertaking's safety management system. The certificate is authorized for one or more categories, including shunting locomotives and/or carriage of passengers and/or goods. According to the Directive, management system may exclude metros, trams and other light-rail systems, as well as private networks which are utilized only for transport activities done by the owning railway undertaking. (Danish Technological Institute et al., 2007; Directive 2007/59/EC, 2007)

Education in Sweden

Due to European Directives, changes have also happened in the Swedish educational sector. The history leads back to 1955 when diesel locomotives were gaining grounds from steam locomotives, and new technologies had to be learnt. At that time school was called SJ-skolan, and it was located to Ängelholm because there was an empty locomotive shed available. Once operations and infrastructure management was divided into two and Banverket was established, the school's name was changed to Banskolan. One more change happened in 2006, when the educational institution's name was changed to Järnvägsskolan. Järnvägsskolan is the largest such kind of educational institution in Scandinavia, and it educates 6000 people via 600 courses annually. Today all kinds of railway specialists are educated under the same roof. The course plan offers technical basic and specialized courses, general courses for example on traffic safety issues, as well as industry and professional training specially adapted for railway sector's needs. Järnvägsskolan is also having two "Qualified Vocational Educations", railway engineers and engine drivers. There is also a three-year railway engineer education, which is organized jointly with Lund University (Lund Tekniska Högskolan). (LTH Nytt, 2009)

Company case / TCC

Sweden belongs to countries which were in the front line in starting the deregulation process. The first steps were taken in the late 1980s but the process really started in 1990s. Once new railway undertakings started to enter the market, the incumbent SJ noticed they could not educate all engine drivers. This provided possibilities for other educational institutions. Transport Competence Center, TCC, was established in March 2000 to offer education in the field of rail transport. Although the market entry process was cumbersome and full of pitfalls, due to company management team's extensive experience in the railway industry and great insights into their customers' needs and wishes, they were able to ride out the storm.

Rail education market in Sweden is open for competition. Although the market has several actors, TCC has gained a good foothold and is growing rapidly. Today they have operations in seven different locations: Gävle, Hallsberg, Bollnäs, Mjölby, Boden, Vännäs, Huddinge and Göteborg. In order to guarantee the teachers in TCC have adequate knowledge, they need to fulfil few requirements before starting to teach. The requirements are: At least three years' working experience as engine driver, passed training in teacher education and documented thorough knowledge of the subjects in question.

The development process of both freight and passenger markets in Sweden have been rather positive, and volumes have increased. This naturally creates pressure on education, but TCC is ready for future challenges. TCC is known for its flexibility and customer-oriented nature. Due to rather small size TCC is able to do quick and efficient decisions, which strengthens the quality. Naturally one key asset is good personnel, which is really important in order to succeed in the market. TCC has really good relations with other actors in railway market, no matter whether they are governmental authorities, customers or even competitors. Everything builds on personal relationships and trust.

-Mr. Peter Hornegård and Mr. Rolf Greijer, TCC-

Previously there existed one institution providing education for railway sector (Järnvägsskolan), but today the education is provided in several places. Järnvägsskolan in Ängelholm is still the main actor in educating the infrastructure maintenance workers, but for example Transport Competence Center (TCC, presented above) which was established in 2000 has become a significant actor in educating the engine drivers (Järnvägsskolan, 2012; TCC, 2012). Furthermore, Lund University as well as KTH Royal Institute of Technology are offering bachelor and master level education related to railway industry (KTH, 2012; Lund University, 2012). Engine drivers and other railway workers are also trained (or given additional courses) for example in Östersund Järnvägskompetens, Nyköpings Järnvägskonsult, TCC Transport Competence Center AB, Nordisk Spårsäkerhet AB, Utbildningscentret för kollektivtrafik AB and TrainDrivers AB. (Danish Technological Institute et al., 2007)

Education in Denmark

The change of market structure was the driving force of revising the railway education. The need to change the structure was realized in 2002, when the first public tender was introduced. Earlier DSB had been responsible for educating all engine drivers as well as deciding the content of the curriculum, but once Arriva won the tender and took over the passenger transport in Jutland in 2003, the system had to be modified. Starting from 1st April 2005 the railway market education was changed, and the Ministry of Education together with the Ministry of Transport became responsible for educating personnel for railway sector. Since, the basic education has been organized in two public vocational schools, EUC Syd in Tønder and CPG West in Ishøj (Danish Technological Institute et al., 2007). EUC Syd is a vocational college for trades and industry. School was founded in the 1920s and it is located in Jutland, Southern Denmark having activities in four cities (Sønderborg, Aabenraa, Tønder and Haderslev). Alike, CPH West gives vocational and secondary education. Access is possible only for persons being employed in one of the railway undertakings or infrastructure managers, and is always approved by the Transport Authority. (CHP West, 2011; EUC Syd, 2011)

Education in the UK

The British railway industry is educating the personnel mainly in-house. Naturally, this has a direct influence on reducing the demand for rail training services. Although operational training is done in-house, some trainings, for example related to safety issues, might be outsourced. Since 2000 the British railway undertakings have spent over 30 million pounds on investment in new training facilities and simulators. Generally the market is considered to have a surplus of engine drivers, mainly because increased salaries and improved working conditions have attracted new people to the industry. (Danish Technological Institute et al., 2007)

Education in Finland

In Finland the main institution offering rail education is VRKK (VR Koulutuskeskus, VR Education Centre), which is the old incumbent's educational centre. It is the only institution which educates engine drivers in Finland. Additionally there are two institutions which are offering small-scale education related to track maintenance etc., Proxion and Kouvola Regional Vocational College. (KSAO, 2012; Proxion, 2012; VRKK, 2012)

3.2 Rolling Stock Maintenance

Deregulation of the railway market has had a direct influence on the rail-related services, especially rolling stock maintenance. The amendments to the European regulations related to safety (The Railways and Other Guided Transport Systems, Safety) came into force in August 2011. The amendments introduced some changes to the 2004 European Safety Directive, and those were mainly concentrated on: 1) commanding an entity in charge of maintenance to railway wagons and making sure that the entity was registered on the national vehicle register; and 2) display a formal maintenance system for an entity in charge of maintenance to ascertain that the wagons it is responsible for are safely maintained. (ORR, 2012b)

Rolling stock maintenance has attracted a lot of discussion also in the European Parliament level. At the end of March 2012 Members of the European Parliament (MEPs) and other stakeholders gathered in Brussels to discuss about the right conditions for efficient rolling stock maintenance in the open market environment. Mr. Patrizio Grillo, Deputy Head of the Single European Railway Area Unit, DG MOVE, European Commission highlighted the vital role of maintenance in guaranteeing that rolling stock deliver a safe performance. EU legislation has brought some clarification who is responsible for the maintenance once the concept "entity in charge of maintenance" was introduced. According to Mr. Grillo maintenance should not become a market entry barrier for new entrants, and *"the regulatory framework needs to give the possibility to outsource maintenance".* Representatives from the European Commission, SNCF (French Railways) and EuroMaint (leading private maintenance company in Europe) highlighted in order to have an open market for operators' access to rolling stock maintenance services and free competition between the maintenance service providers, there is still a lot which needs to be done, without forgetting high standards of safety and not jeopardizing the employment. Some countries have been able to make a success out of it; Ole Kjörrefjord, Senior Advisor to the CEO of EuroMaint Rail, stated that outsourcing the maintenance is the best way to proceed. He stated *"Outsourcing maintenance in Sweden brought huge gains in productivity and costs, whilst safety increased. Liberalization of maintenance starts with exposing operators to competition."* (Railway Insider, 2012) Other representatives commented other countries should follow the examples of Sweden and the UK, where the rolling stock maintenance markets are open to suppliers. As an important feature was highlighted access to existing workshops. (Grillo, 2012; Railway Insider, 2012)

Maintenance Sweden

Currently Swedish rolling stock maintenance sector has several actors. Although Jernhusen still owns a great part of rolling stock maintenance depots and therefore has become a near monopolist in the market for this kind of facilities (Alexandersson and Hulten, 2009), some private terminals are established. Even though EuroMaint and Swemaint still have a large share of maintenance market, new companies have entered the industry. For example, German based mgwService has a workshop in Hallsberg and Mantena in Råå, nearby Helsingborg (Mantena, 2012; MgwService, 2012).

Maintenance in Denmark

The Danish market has national peculiarity when it comes to organizing the rolling stock maintenance. Due to Danish taxation law the rail passenger sector is exempt from value added tax (KPMG, 2009). Therefore, railway undertakings prefer to maintain rolling stock in their own maintenance depots. The largest maintenance company in the market is DSB Vedligehold, which became a limited company wholly owned by DSB in 2011 (DSB Vedligehold, 2012).

Maintenance in the UK

The British government launched the White Paper titled as "New Opportunities for the Railways –the Privatization of British Rail" in July 1992, and it led to Railways Act in 1993. These documents blazed a trail for many competitive entities to unfold. The rolling stock maintenance market was no exception. According to the White Paper (1992, p. 14):

"Independent operators and franchisees will need to have assurances about access not only to the track but also to maintenance depots. Heavy overhaul and repair activities on BR's locomotives and rolling stock are presently carried out by British Rail Maintenance Limited (BRML) and by other BR depots. This is an activity where the Government believes that the involvement of the private sector would bring benefits."

As mentioned in the White Paper, during British Rail era the rolling stock maintenance was done by British Rail Maintenance Limited (BRML) and other British Rail depots. The situation changed during spring 1995, when the British Rail sold seven maintenance depots controlled by BRML to three separate purchasers. Among the businesses were a small electronic service depot and six heavy maintenance depots. The main objectives of the sale were 1) to transfer the maintenance depots into the private sector as soon as possible via competitive process, 2) to maintain safety, reduce costs and ameliorate the efficiency and viability of depots within a competitive environment, and 3) to gain the best possible market price, taking few important factors in mind (account of sales costs, staff interests and the need to reduce liabilities in the public sector). All manufacturers of rolling stock and related components were actual or potential providers of heavy maintenance services. As the main companies undertaking heavy maintenance were listed ABB Transportation, Babcock Rail, Bombardier Prorail, GEC Alsthom, Hunslet Barclay, Metro-Cammell (part of GEC Alsthom) and RFS Industries. Besides, the train operating companies undertook some heavy maintenance for the rolling stock leasing companies and freight operating companies. According to National Audit Office (1996), there should be a possibility for these companies to make more heavy maintenance after the franchising period was over. (National Audit Office, 1996; Railways Act, 1993)

Company case / Davis Wagon Services and WH Davis

WH Davis was originally formed in 1910, initially as a wagon repairer and maintainer but diversified into a wagon builder, whilst retaining some of the repair and maintenance services under local contracts. Having been in business for some 100 years, in 2007 an opportunity arose to purchase a number of contracts for outstation maintenance business from Marcroft Engineering, which had been ordered by the UK Competition Commission to divest some of its business. Therefore Davis Wagon Services was created on 18th May 2007. Davis Wagon Services is an independent maintainer of rail freight wagons within the mainland UK, and they work closely with their parent, WH Davis. Due to this close cooperation Davis Wagon Services is able to supply customers with a lifetime package of freight wagon support from the initial design through to build and field maintenance. Davis Wagon Services have an approved management quality system which has been audited and approved by Lloyds Register to BS EN ISO9001:2008. They are also compliant and certified to GM/RT2450 by the PWRA group.

owners decided the only way to get around this problem of individual wagon movement was to do more heavy maintenance out in the field, and not send the wagons back to workshops as it was now no longer viable in terms of cost. This really changed the nature of the business. The new approach was classified as 'balanced maintenance'. However, over the years' wagon owners have since realized that balanced maintenance wasn't quite such a good idea after all, as it wasn't fully thought through. Therefore, in some cases, private owners are now working towards (or indeed have already commenced) bogie exchanges in the field and this might lead to also undertaking General Repairs.

In the UK there are a number of companies offering repair and maintenance services to private wagon owners, leasing companies and Freight Operating Companies. However, the current largest UK Operator of freight wagons, DB Schenker (formerly EWS/British Rail) also has its own repair and maintenance workshops. Wagon leasing companies simply offer wagons to the market i.e. they do not haul trains nor carry out repair and maintenance themselves. The margins are not high enough to encourage new wagon repair/maintenance entrants who might offer a nationwide service. There really haven't been new entrants for many years, apart from relatively small, specialized engineering companies which operate from old workshops which used to belong to British Rail. They usually offer specialized services, mainly for the passenger sector such as air-conditioning overhaul etc. There are no new entrants to the rail freight business, bearing in mind that freight and passenger in UK are totally separate businesses.

Although vehicle maintenance market is functioning rather well in the UK, difficult working conditions are not uncommon. There are usually no covered facilities when doing maintenance out in the field. Furthermore, operating companies often hire a fleet of wagons with exactly the number of needed wagons (no extras), which complicates the maintenance. The biggest problem is wagons being available to carry out the maintenance, having spares and having time to do it. Generally the maintenance regimes are functional. Even though vehicle maintenance market is confronting some problems, Davis Wagon Services is satisfied with the situation. The company is a traditional freight wagon repair and maintenance company with true values; their aim is to form strategic partnerships with wagon owners, Train Operating Companies, leasing companies or hirers with the ultimate aim to run a safe and compliant railway system.

-Mr. Richard Simons, Davis Wagon Services and Mr. Ian Whelpton, WH Davis-

Today the British rolling stock maintenance market has several actors. Although some railway undertakings are doing the maintenance by themselves, there are few rolling stock maintenance companies. Among these are for example Davis Wagon Services (company case presented above), Wabtec Rail and Train Maintenance Solutions. (Davis Wagon Services, 2012; TMS, 2012; Wabtec Rail, 2012)

Maintenance in Finland

The Finnish rolling stock maintenance is mainly done in-house by the incumbent, VR. Some small-scale companies offering rolling stock maintenance services exist, for example Steelwheel located in Kouvola. (Steelwheel, 2012; VR, 2012)

4 Research Environment and Data Gathering

4.1 Research Approach

As described in previous chapters 2 and 3, the researched market areas vary both in the level of deregulation as well as the way to organize the rail-related services. Sweden and the UK were in the front line when deregulation trend entered the European railway industry: Sweden started the process in late 1980s and finalized it in the freight sector in 1990s and in passenger sector in 2010, while in the UK the process was initiated in early 1990s. Denmark is lagging behind in the development process, as only the freight sector is open for competition. In passenger sector the private railway undertakings have entered the market only via tendering processes, in addition to the incumbent and the small-scale regional private railway undertakings (who possess and operate their own infrastructure). The status of deregulation has high impact on the number of operating railway undertakings. Swedish market has attracted a great number of railway undertakings, currently the market has 35 railway undertakings having the license to operate on the market. In the UK the situation has settled down a bit, today the market has seven railway undertakings offering freight services and around 20 passenger sector railway undertakings. As described earlier, Danish railway market has a strong history of private networks, which is visible also in today's market structure. Four privately owned networks and operators are operating in certain small areas. In addition to incumbent DSB, operating contracts have been given to two companies.

Due to the fact the research's main objective was to gather genuine data from operational level, a semi-structured theme interview was chosen as an interview type. This method of interview has been regarded as a valid way to scrutinize data in similar researches (see for example Laisi, 2009; Laisi and Poikolainen, 2011). Based on Hirsjärvi et al. (2009), conducting a test-interview themes' adequacy can be confirmed and interview's duration can be verified. Although all researchers try to avoid making mistakes, the results' validity and reliability might range. Therefore, the reliability of every interview should be questioned. According to Hirsjärvi et al. (2009), repeatability of the results is a proper way to confirm the reliability. This implicates if the same study is redone, the results are identical. When special attention is directed to validity, the indicators or research method's aptitude to measure the intended factors can be guaranteed. Especially if interviewer and interviewee are using other language than the native one, language barriers might hinder the process and lead to misunderstandings in questions. (Hirsjärvi et al., 2009) In this research the reliability was confirmed by recording all interviews, which ascertained the availability of repetition. As the party conducting the research, Lappeenranta University of Technology's Kouvola Unit has done numerous similar interviews formerly, the validity of the questionnaire basis was checked already in earlier studies. However, in order to include all interest groups' viewpoints, questionnaire was carefully discussed in project's steering group meeting, which guaranteed correct questions were asked from relevant interviewees.

Lappeenranta University of Technology's Kouvola Unit has done similar studies before and thus the researcher had some knowledge about the market actors. As the intention was to understand the standpoints of several different market actors (rail-

related service providers, railway undertakings, terminal owners etc.) and in order to confirm all relevant actors were contacted, some publications presenting the markets and actors were scrutinized. Once the most important actors' names were known, further contact details were gathered and checked. All groups were contacted by sending an email with a cover and information letter (see appendix 1 and 2). Swedish actors were contacted in Swedish and English, whereas in Denmark and the UK English version was used. E-mail was sent to 13 Swedish (appendix 3), 8 Danish (appendix 4) and 6 British (appendix 5) organizations. In the cases where actors did not return to original e-mail, a reminder was sent three days later. If still no answer was received in one week after the original contact, actors were contacted by phone in order to confirm all intended participants were reached. In few cases the correct contact person had not seen the information letter, which was resent in order to give the respondents a possibility to familiarize with the research before actually agreeing to participate in the research. All interviews were agreed by e-mail. One week before the agreed meeting time the questionnaire (appendix 6, 7 and 8) was sent to interviewee, in order to give them time to prepare. In the same email the place of interview was confirmed once more, in order to have a solid knowledge where the meeting was to take place.

4.2 Theme Interview

Theme interview is an interview type, which combines structured and open interviews. Although the themes discussed are known, a certain order and strict form of questions is missing. Therefore, the interview can process based on the discussions rather than strict order of questions. The theme interview as a research method was introduced by Merton, Fiske and Kendall in 1956 in their book "The Focused Interview". The book revealed four different characteristics for theme interviews: 1) interviewees have experienced a certain phenomena, 2) research has tentative knowledge about the subject, including its sections, structures, processes and entity, 3) researcher settles a framework for interview, and 4) interview focuses on subjective experiences concerning the topics, which have been pre-analyzed. (Hirsjärvi et al., 2009; Merton et al., 1956) Theme interview is often regarded as a synonym for qualitative research, because it has been widely utilized in business economics. One of the key characteristics of theme interview is the fact that it concentrates on certain themes rather than solitary questions. The similar themes are discussed in all interviews, which confirm the received information is based on same subjects. This type of research method enables interviewer to discuss the topics more freely, which might facilitate the respondent to unfold the viewpoints. (Hirsjärvi and Hurme, 2010)

Due to the fact that this research concentrated on several groups of actors (maintenance companies, educational institutions and terminal owners, railway undertakings and infrastructure managers) and the objective was to understand the situation in the market via their standpoints, the questionnaires were modified to respond the certain actor groups' situation. However, in all questionnaires the basis was the same, including five main themes. The themes followed the research's structure, and included topics such as company background, entering the market and market environment, cooperation and governmental bodies' actions (see appendix 6, 7 and 8). The main differences between the questionnaires were in the third theme, market environment, which concentrated on the rail-related services. By evaluating carefully the needed data, some questions were added or removed based on the

interviewees' background. Theme interview was chosen as an interview type for this research because it provided needed information concerning key problems and deregulation's influence on rail-related services. It enabled to study the various actors' cooperation, as well as to understand the social consequences. The objective was to compare the results between the countries, and to understand the peculiarities in the national level.

4.3 Collecting the Data

In order to guarantee the interviewees had adequate knowledge regarding the study's objectives, the manager level was contacted in all case companies. Most of the interviewees had a long history in transport, often also in railway market. Altogether were interviewed 19 persons representing 15 companies. The Swedish interviews started the process in January 2012. Altogether nine persons representing seven companies were met. Danish interviews followed the Swedish ones in February 2012, and in Denmark were met five persons representing four organizations. The British interviews were conducted in April 2012. Also in the UK were met five persons from four organizations. List of interviewees can be found from appendix 9.

Because all main groups (rail-related service companies and railway undertakings) from all research countries were met, validity is confirmed. Additionally, as Danish and Swedish infrastructure managers' were met in earlier researches (and therefore the market structures were rather clear), in order to gain similar knowledge from the third case country, the UK, a meeting was organized with the British infrastructure manager. All interviews were arranged by email and conducted in interviewees' offices except one, which was done at the airport. All meetings were held during normal office hours. All interviews were conducted in English, except for one Swedish interview where both English and Swedish were used.

Table 14 Conducted interviews

Date	Type of company	Location	Duration
23.1.2012	Railway undertaking	Sweden	91
24.1.2012	Educational institution	Sweden	88
25.1.2012	Facilities' owner	Sweden	85
31.1.2012	Maintenance company	Sweden	125
1.2.2012	Maintenance company	Sweden	71
2.2.2012	Educational institution	Sweden	90
3.2.2012	Maintenance company	Sweden	77
7.2.2012	Railway undertaking	Denmark	94
9.2.2012	Railway undertaking	Denmark	93
10.2.2012	Educational institution	Denmark	75
28.2.2012	Railway undertaking	Denmark	118
24.4.2012	Infrastructure manager	UK	62
25.4.2012	Wagon manufacturer Maintenance company	UK	105
26.4.2012	Educational institution	UK	50
26.4.2012	Railway undertaking	UK	52

Interviewees were informed beforehand that the interview takes one to two hours. Generally duration varied from 50 minutes up to two hours (see table 14). Before starting the interview (and recording), research's background was described and the interviewee's role was clarified. Permissions to record the interviews were asked and all participants allowed recording. After the interviews, minutes of the meeting were written combining all relevant information. The document was sent to interviewee for checking. This way interviewee had a chance to check the information once more, and for example correct misunderstood thematic entities.

4.4 Methods Used to Analyze the Research Data

The main objective of research is to analyze, interpret and make conclusions of the gathered data. While analyzing the data, the types of responses unfold to the researcher. When conducting an empirical research three prefaces must be done. First step is verification of the research data. Interviewer needs to check whether some information is missing or is all data correct. Second face is to boost the data, for example enlarge the responses. Third stage is systemizing the gathered information for saving and further analyzing. (Hirsjärvi et al., 2009)

After the analyzing process has been started, certain key characteristics which have unfolded in several interviews are scrutinized. Often the basis is in the main themes, but sometimes unexpected aggregates might appear. Themes which unfold from the respondents' viewpoints are always interpretations made by the researchers. It is unlikely two interviewees express the answers exactly the same way, but the researchers can code the answers to the same categories. (Hirsjärvi and Hurme, 2010)

Academic research has recognized there are several methods to analyze the gathered data. Often are referred to two methods or reasoning, deductive and inductive approach. Inductive approach generates new knowledge for present theories, while deductive concentrates the topic from general to specific data. (Brown and Eisenhardt, 1997; Burney, 2008; Hilmola, 2003; Hirsjärvi et al., 2009; Saunders et al., 2000) Case studies often utilize inductive approach, but Hilmola (2003) noticed often researchers using case study as a research method are combining both approaches (Häkkinen and Hilmola, 2005). This study is mainly concentrating on inductive approach. Study's objective is to present new findings and confirm the existing ones, which fulfils the facts related to inductive method.

5 Empirical Results

The research's empirical section was conducted in three countries during spring 2012. Although the study mainly focuses on Sweden and Denmark, few interviews were done in the UK in order to understand the situation in a market, which went through the liberalization process earlier than the other counterparts. Altogether 15 interviews were conducted, seven in Sweden, four in Denmark and four in the UK. Among the interviewees were educational institutions, rolling stock maintenance companies, railway undertakings and governmentally owned organizations. Therefore, the empirical section provides a rather good comprehension what is happening in these markets. The empirical section is built as follows: The results are covered country by country, dividing the results to research's main themes (general market conditions, education, maintenance, stations and sales of tickets, and cooperation). The tables presenting the interview outcomes are available in appendices 10-25.

5.1 Sweden

5.1.1 General market conditions

Like in other liberalized railway markets, the Swedish market has few general conditions which portray the sector. The fact that the deregulation process started already decades ago has influenced the market, as actors have acquainted to the situation. On the other hand, great amount of current railway sector's employees were employed by SJ, which still today influences on the railway undertakings' culture. Interviewees noticed the market environment will change once more new generation enters the industry, which enables the market to confront a new era with fresh and innovative ideas.

Flexibility was mentioned in almost every interview. The old governmental companies were discovered to lack flexibility, which hinders the development and was regarded as the biggest weakness. On the other hand, small companies have the highest flexibility, as they are able to make quick decisions and if needed, change the way of actions with dispatch. Sweden was regarded as the burgeoning market in Europe, mainly due to the fact that the market has undergone some significant changes during the last years. Liberalization of passenger transport sector enables new railway undertakings and service providers to enter the market. Although it was mainly stated to refresh the market, some interviewees highlighted if too many actors are involved in small market area, some might confront problems in finding customers. Therefore in order to have a foothold on the market, actors need the trust of a customer.

Because railway industry differs a lot from other industries, people are mainly recruited from other railway undertakings, maintenance companies and so on. Some people also enter the market directly from educational institutions. In these cases it is vital to transfer the tacit knowledge from old employees to new ones, in order to guarantee a proper knowledge level. It is important to have a good mix of people. Due to the fact that railway industry is rather traditional, certain issues remain important. These include for example systems, safety etc. When considering the Directive 2001/14/EC and the requirements stated in the minimum access package, all respondents said the matters have been handled rather well. The situation might

change in the future once the number of railway undertakings operating in the network is increasing. This might lengthen the running times, which is not good for anyone, passengers or railway undertakings.

The rail-related service market is confronting various types of challenges. Due to Sweden's location, winters can be harsh which has direct influence on railway transport. According to interviewees the market has two main problems: Climate and infrastructure. Infrastructure maintenance was unfolded many times, because it affects on all actors' operations. While the number of railway undertakings and therefore the used capacity on the network has increased, there is no time to do network maintenance, due to too tight schedules. For example, currently in Sweden only 20 per cent of maintenance is done in advance, while 80 per cent is remedied only after something has broken down. Market actors are aware that maintenance work which normally would take one week (if the network would be closed down during the work) can take up to four months because the work cannot be done without interruption. Money is always an issue when dealing with infrastructure, and the interviewees hope to see increased investments from governmental side, in order to enhance the Swedish railway sector. As an option to facilitate the situation graduated pricing has been offered, meaning the peak hours would be more expensive to operate than the other hours. This might change the market structure, and maybe some railway undertakings would like to save up access charges by driving quieter shifts.

Another challenge which is creating a lot of discussions in the railway sector is the granted capacity. For small railway undertakings it is almost impossible to invest in rolling stock as they get a contract for one year. If the fleet is needed also without the contract there is a reason to buy it, but if the rolling stock is needed only if the contract is won, it is too expensive for private railway undertakings. The situation is different for big railway undertakings which can place the rolling stock to some other traffic. Due to new EU legislation the capacity is always granted for one year, which is a conundrum for private railway undertakings. When considering the capacity, another problem is created by the fact that local, regional and national competition is utilizing the same network in big cities. Which traffic type should be prioritized? Finally, the market actors have a feeling that no one is controlling the market, which create cumbersome situations. In order to have a well-functioning market, someone should take whole responsibility.

Even though the market has several critical issues, it has great possibilities. People create the market, wherefore good cooperation was noted to be related with people. Deregulation has had a positive influence on the market. Volumes have increased and whole sector has evolved to a better direction. A lot of people are retiring during the coming years, but the fact that so many young people are interested in the sector guarantees a safe continuation of the market. Since deregulation the salary levels, especially engine drivers' salary, have increased, which is a carrot for many people. Organizations acting in the market have been able to attract good personnel, which was an asset in order to succeed in the market. In the end it all comes down to flexibility and cooperation. Flexibility creates new possibilities, because when you have your eyes open for new possibilities, anything can happen.

Even if market deregulation has created possibilities, some improvements are still needed. Market is considered to need new competence, but the actors think market neither the authorities are ready for it yet. In order to change the situation, special

attention should be paid to educating the people. Another proposal for improvement which was unfolded several times is to ensure free competition. Current system does not totally support it, due to high investments needed when starting the operations. As a solution was highlighted a pool which would own all locomotives and wagons. Companies wanting to operate in the market could rent the fleet from the pool, which would mean that all railway undertakings would be competing in the same line and it would be fair, and only the truly important matters such as customer service would count. As stated already earlier, in addition to the pool a body which would be responsible for whole market could facilitate the market structure. Currently no one is responsible for whole environment, which creates problems. Earlier the incumbent was in charge of all operations, stations, infrastructure and maintenance workshops, but once the situation changed due to deregulation, no one knew how to react to the situation. It has taken long to make the market really work, because many people have background from SJ and have taken the same culture to other railway undertakings. According to interviewees the railway market is now starting to work as it should, as more new people are entering the market.

Generally, the actors in railway sector have realized it is important to look the customers' perspective. According to interviewees earlier matters were mainly discussed on technical and system levels, but customers were often forgotten, especially in governmental level. As it all comes down to customers and the fact that they are using the railway transport (no matter whether they are passengers or customer dealing with freight transport), all actors need to give value for customers. Everything builds on trust, and interviewees noted the main thing needed in business is a trust of a customer. In the end it is all about the personal relationships. European Union was mainly seen to create possibilities, but also some discordant notes were heard. Governmental bodies do not know how to proceed with European Union legislation, which hinders the operability of the market. The fact that no one is supervising the market creates great challenges, as different sectors inside the market are concentrating on different issues. In order to have a well-functioning market, common target should be set.

5.1.2 Education

Earlier in the Swedish market Järnvägsskolan was the only actor offering railway education, in addition to the fact that the railway undertakings were educating their own personnel. Due to changed market structure (mainly related to market deregulation and market entry of private railway undertakings), the market has free competition and new educational institutions have entered the market. Today there is free competition in railway education market. There are many educational institutions around Sweden who have rail education in their curriculum. However, when entering such a specific educational market some market entry barriers do exist.

According to Swedish interviewees, among the biggest barriers are the facilities. Some education can be organized by railway undertakings, but the only safe environment to practice dangerous situations is provided in educational institutions. When considering the personnel, they mainly come from companies working in the railway market (for example SJ and Green Cargo), but also consulting firms. These persons might be really skilled technicians, but in order to become a teacher they need to learn the pedagogy. On the other hand side, the amount of interested students is increasing annually. Every year more people are applying to education than they can be accepted. Basically the institutions do not advertise, not at least in a

traditional way. Most of the institutions have informative Internet pages, additionally they participate in fairs. Nevertheless, the best way to get publicity is word of mouth.

When considering the ways to enter the educational institution, basically there can be three different paths. You can apply personally just like to any other high school education, but the most common way to enter the education is via railway undertakings. Basically this means that you get employed by railway undertaking, which then sends you to study the industry. The third way is through the unemployment office. Due to these different paths, also the paying actors differ a bit. Depending on your situation, the payer can be the unemployment office, railway undertaking or government / the vocational school authority (youngsters' education). However, in order to have a functioning system, the vocational school authority requires that the branch which needs the students, in this case railway, participates in the education by taking students into practical trainings. It's important that the sector which needs new employees is active, although main financing comes from the tax revenues.

When considering the challenges in the railway education sector, many interviewees noted the fact that companies do not have money to educate the personnel due to strong competition creates problems. Companies do not consider safety issues as carefully as they should, which has led to fatal accidents during the last years. Same problem was noted in the UK many years ago. In Norway and Denmark they had the same system as in Sweden but infrastructure maintenance was again taken back to authority. Additionally, many respondents highlighted it's really important that all railway undertakings need to take responsibility for let the train drivers practice. Without this it's impossible to have enough engine drivers in the coming years. Once the number of railway undertakings has increased, people requiring education are located around the country. This creates problems to educational institutions, and few have introduced a possibility to offer some education at railway undertakings' premises. According to interviewees the institutions should offer education in various places, which would decrease the threshold of sending employees to education.

Also the European Union's actions are creating challenges. For example, the new requirements of licenses are not totally clear for sectors' actors, which create cumbersome situations. Finally, the common language is something what is discussed a lot in the industry. In Europe there are three main railway languages: Italian, German and French. English do not exist in railway industry. Today the common language seems a bit far away because most Italian or French engine drivers do not come to Sweden. In the future there will be new techniques which may reduce the need for common language. Among these is ERTMS, which should be extended to whole Europe. This creates possibilities for educational institutions, mainly because it can enable new requests related to courses e.g. in neighbouring countries, mainly Denmark and Norway. Finland was noted a bit tricky, due to language. Overall the market has great possibilities. Interviewees mentioned sometimes people say the situation was better in the past, but deregulation brought to the market new kind of focusing which has been really positive.

5.1.3 Maintenance

After the privatization of EuroMaint (once used to be incumbent's rolling stock maintenance), new companies providing maintenance services for locomotives and wagons started to enter the market. Behind quite many entries has been tendering

processes, which have provided new companies a good backbone to start the business. Although the market is not that huge, today there are still three to five companies which are often involved in tenders. When looking at the railway undertakings' perspective, this is a good situation. When having several actors in the market, companies providing the services need to pay special attention to pricing and quality. Quality is an important factor also in the maintenance companies' personnel. In order to be a highly skilled worker, various types of skills are required. When considering the background of rolling stock maintenance companies' personnel, new recruits are attracted from other maintenance companies / other sectors of railway industry or directly from educational institutions. According to respondents a good mixture of people is important, in order to have a well-functioning maintenance operations. The fact that employees in maintenance need high level technical knowledge creates problems, as it is not always easy to find personnel with required experience. Furthermore, the fact that today a lot of maintenance is done out in the field requires the workers to be really flexible as well as have really high skills and level of knowledge.

The pricing policy has changed during the last decade. Earlier the state-owned companies were able to charge basically whatever they wanted, but today the contracts are mainly related to driven kilometres. Therefore in the contract there's a lot of risk, and due to this type of contracts, winters are really hard times for rolling stock maintenance companies. While competition is increasing, companies need to pay special attention to customer service's quality. Many service providers' target is to keep the trains running and provide 24/7 service in whole service network. Once they give good service, it comes back as new customers, because after gaining one contract, it's easier to get another one.

In Sweden the rolling stock maintenance companies either have their own maintenance workshops or in some cases they are using the customers' workshop. It should be kept in mind that nowadays the locomotives are like *"PCs on wheels"*, and some workshops are not ready to maintain such sophisticated locomotives. For example, If company provides maintenance e.g. for freight wagons or diesel locomotives it is not wise to maintain electric locomotives in the same location. If there is maintained at the same time electric and diesel locomotives, a lot of dust can have negative influence on electric locomotives. Another important matter is the difference between preventive and corrective maintenance. Preventive maintenance is done before something happens, and corrective when something has happened. In order to have a well-functioning fleet of rolling stock, special attention should be paid on preventive maintenance.

When considering the challenges in the rolling stock maintenance market, various topics were unfolded. Topics related to wheel profiling machines were mentioned few times, as well as the fact that condition of Swedish infrastructure and climate create problems to wheels. Additionally access to infrastructure and workshops as well as availability of high-cost components and tools were highlighted as topical issues. The life cycle of workshops is rather long, so it's always not cost-efficient to buy and own a workshop. For example, if the maintenance bid is won by another company next time, should the owner of the maintenance depot sell it to the other company? Interviewees think the Swedish state has to put the infrastructure to the market, in order to provide a market where different companies can compete in the same level, with the same conditions. The fact that companies start operations in rolling stock

maintenance market after winning a tender facilitates the market entry, because often in tender is stated that the party who wins the bid will get a workshop, tools and high-cost components. This enables companies to bid at the same level with earlier governmentally owned company. According to interviewees the material what is needed to maintain the trains is very expensive. The material can be bought only from few places, which means the market is not open. In the final stage it is the customer taking the train who has to pay the high costs.

5.1.4 Stations and sale of tickets

Sale of tickets was regarded a really problematic issue since many railway undertakings have entered the market. At the moment the Swedish market has 35 railway undertakings (including passenger and freight companies), and as every company has their own ticketing system, customers are getting confused. The fact that all tickets cannot be used in all trains is rather hard for people to understand, and it was mentioned as a backside of deregulation and open market. For example, if you have a ticket to a certain train but for some reason train does not come, naturally you will take the next train. This train might belong to the competitor where the same ticket is not valid. Therefore Swedish actors are eager to see how the ticket sales is organized in future because some changes are needed. This creates tension between the companies, because they should agree on systems and decide how to split the revenues etc. Additionally, passenger information was considered not to function as well as it should. Based on interviewees the authorities are trying to make it better, but it has been a problem since late 1990s. When considering the ownership of stations, those are mainly owned by the railway undertakings or Jernhusen. Even if the market is functioning rather well, some interviewees were wondering the pricing policy of Jernhusen. The situation is expected to change in the near future.

5.1.5 Cooperation

Overall the cooperation in the railway sector is good. While railway undertakings are competing with each other, they are still working together in order to have a well-functioning market. When thinking about the cooperation with the governmental actors, both Trafikverket and Transportstyrelsen were perceived to be rather easy to contact and help was available if needed.

Even if the level of cooperation is good, some cumbersome situations do occur. For example, sometimes actors feel that governmental bodies are not totally sure who is responsible for what. This can lead to a cumbersome situation as one is saying one thing and the other one something else. Based on interviewees this might have something to do with corporate cultures, as big organizations tend to have problems. Among the main issues is to make them understand who the final customer is. In order to have a better functioning market, governmental actors should improve their cultures. Interviewees noted governmental bodies have always been good at analyzing things, but making them happen is the problem. Although personnel at governmental bodies were said to be helpful and friendly at all levels, at the same time they were requested to improve the service. Systems are regarded old-fashioned, and they should especially improve the things which have direct influence on reality. Finally, one area which was highlighted to create problematic situations was implementation of EU legislation. For example the engine drivers should get some sort of licence, but no one knows detailed information about the license (where to get it, how it should look like etc.). It is really hard for maintenance companies as well as

railway undertakings to implement the regulations in a good process, because they cannot get the information which would be needed in order to proceed.

5.2 Denmark

5.2.1 General market conditions

When considering the general market conditions and especially market entry, the peculiarity of Danish railway market has to be kept in mind. Although the freight sector is open for competition, passenger market is still partly regulated. In addition to incumbent DSB, the market has few smaller scale private railway undertakings and two companies which have entered the market via tendering processes. "Invitation to tender" –document describes the related services railway undertakings could hire, including for example break rooms, marshalling areas, fuelling, washing area, maintenance workshops etc. All these are stated in the document as well as the price, which is negotiated by Trafikstyrelsen and DSB. This has direct influence on the level of market entry barriers, which were noted rather low. If the new entrant should have bought own rolling stock, for sure that would have been a barrier. According to interviewees, among the main market entry barriers is the competition with other transport modes, especially with car, but in cities also bicycle.

All interviewees mentioned the Danish infrastructure needs improvements, mainly due to the fact that electrified network is short. In order to enable environmentally friendly transportation, electric locomotives should be used in more lines. Government has heard the requests and more networks will be electrified in the near future. Sometimes the maintenance work takes too long from Net Rail Denmark, although they have all modern equipment. Therefore the maintenance is postponed. This has an influence on available capacity. Some companies have faced a situation, where they have been given too ambitious timetables. Basically this means that if a slight delay occurs, all trains are running late. Governmental authorities have noticed the problem and the situation have been changed. Because the operators' incentive programs are concentrated on high punctuality and the amount of driven kilometres, operators are not interested in providing good service to customers. When considering the minimum access package (Directive 2001/14/EC), it functions rather well in Denmark. Handling of requests, the right to utilize the granted capacity, use of running track points and all other information are working perfectly, but in some areas train control should be improved, due to outmoded systems. Earlier some places had only a loudspeaker to inform the passengers, but in order to increase customer satisfaction, some large-scale improvements are done.

The general attitude towards railway transport was noted positive, especially in the regions. However, the big question is to get people to travel by train. The market has great possibilities if more railway lines are opened for tenders. The fact that stations, maintenance depots, cleaning facilities etc. are owned by the incumbent DSB was regarded problematic, although anyone should be able to stop there and pick up the passengers. According to respondents Denmark should have followed the Swedish structure, where Jernhusen was split as an own entity from SJ. Today Jernhusen owns great deal of stations and terminals in Sweden. The strong background of DSB is also creating another kind of challenges. An old company such like state-owned DSB has totally different kind of culture. They think that they know all about the education and how the railway market will develop. Naturally they have a great history, but situation

has changed since new railway undertakings entered the market. As the challenge was regarded that sometimes the big companies do as they have always done, which can create some problems with the partners. Competition was not considered free due to DSB's size. According to interviewees, there has been a lot of discussion how to improve the market. Private railway undertakings do not always understand the way DSB is functioning and the general attitude is that the smaller railway undertakings could do the transport more effectively. At the moment DSB is confronting problems in Denmark, which influences on the whole market. Another thing is to get the railway undertakings as well as governmental organizations to respect each other. Market actors should realize the market has changed, and there are nowadays a number of smaller operators. Railway undertakings are after all trying to provide a good market for customers, which are sometimes forgotten in the incumbent.

Passenger Information systems should be improved. Interviewees pointed out there might be two or even three different kind of passenger information systems at the same station giving all different kind of information to the customers. A common real time information system would be needed. GPS is now available so information where the trains are going is available. The main problem is to inform a customer when the train will come. This also concerns the cases when train is told to be eight minutes late but it comes after four minutes. People can go to shops etc. and miss the train. Information needs to be specific, if train is said to come in nine minutes it has to be there in nine minutes. Today the time is changing up and down. Therefore the information system should be developed in a common way between the railway undertakings and infrastructure manager.

When considering the European Union actions, interviewees noted that EU is mainly going to right direction, but all countries should follow the directives. Denmark was noted to belong to countries which are strictly following EU rules. Generally the Danish interviewees think the European railway market will grow in the future, mainly due to environmental reasons. Few assumed in the future there will be trains running on bio-fuel. Interviewees also highlighted even more high-speed lines are needed on designated areas. Access to train and metro systems should be improved, as it is now rather difficult to access the public transport. For example, more money could be used for parking facilities around the stations in order to get easy access to stations. Free parking place should be included in ticket price when commuting daily. Generally the way of thinking needs to be changed. This is important, in order to make railway undertakings to provide right service to the customers. All actors in railway market should have the same target. This way the situation would be easier for all parties. All actors' focuses should be same, which should be considered also in the tender process. The whole value chain should be aligned. Additionally, personal relationships were regarded really important, because via those the cooperation is a lot better. It is always easier to contact someone if you know him/her personally. And naturally the received service is much better. In the end, deregulation process should be carefully planned. Enough time should be spent when preparing it, and people need to have realistic expectations.

5.2.2 Education

The Danish railway market education confronted revision in 2005 when the government changed the law. Earlier DSB was in charge of education, but due to deregulation and the entry of new railway undertakings, the system had to be changed. Since there has been two educational institutions offering railway

education, in Tønder and Ishøj. According to interviewees starting the education in these two locations was state's decision. When government was changed from social democratic to more republic, the process was started. In the beginning a lot of discussions were going on, especially concerning the location of educational institutes. Although they confronted a lot of problems, all were solved and today the market is rather satisfied with the situation.

In order to get accepted to an institution you need to have a working place in one of the railway undertakings. All students need to go through intensive medical checks (including also psychological examination) in order to make sure they have right skills for the industry. The theoretical part lasts around 10 months, which is followed by practical training in the railway undertakings. Every second year drivers need to re-do the in-house education, wherefore companies have for example own safety and technical instructors. One of the challenges in education is to ensure all learnt matters can be used in practice. Therefore the education covers both theory and practice. However, due to economical situation the railway undertakings are not employing new personnel, which mean the educational institutions do not have students. This is a drawback, as students are really interested in railway sector.

On the governmental side two ministries are involved in railway education, Ministry of Education and Ministry of Transport. Although the educational institutions are under the Ministry of Education, they receive information also from the other ministry. When considering the teachers, all teachers are coming from different railway undertakings, for example DSB, Arriva or Schenker. Due to Denmark's location, language barriers are often unfolded. The fact that engine drivers need to speak German when crossing the German border creates challenges, because if driver's German is too poor, he cannot drive in Germany. Therefore, interviewees think having English as a common language would be a good option. If this is going to be done, it's creating a lot of problematic issues to institutions, for example via the needed changes to materials. Moreover, the fact that all engine drivers who are driving in Denmark need to be educated in Denmark creates challenges. The same applies to other European countries, for example Sweden. When considering the near future, one changing factor is ERTMS which will provide new educational possibilities for institutions. As it is going to change the market, also educational institutions need to get ready for alterations in their education. However, this is mainly seen as a possibility, because actors need further education in order to be able to operate in the changing market environment.

5.2.3 Maintenance

Due to the fact that in Denmark transportation is without value-added tax, if maintenance is done in-house the railway undertakings can save in costs. Therefore, if some sub-supplier would do the rolling stock maintenance for the railway undertakings, the costs would increase by 25 per cent due to the reason that VAT could not be deducted. That is the reason, why most of railway undertakings in Denmark are doing the maintenance by themselves.
DSB has an own rolling stock maintenance company called DSB Vedligehold, but based on the respondents the only reason for such a market structure is the taxation. The number of owned maintenance depots per private railway undertakings depend based on the companies' size. Rolling stock maintenance was noted as one of the core competencies: If too many trains are used, the cost-efficiency decreases.

5.2.4 Stations and sales of tickets

The same ticketing system is used all around Denmark. Additionally, some private railway undertakings have discount tickets which can be only used in their own trains. The reason for such a structure is to attract new passengers. Railway undertakings want to do something else than before. Some railway undertakings have taken the process even further and closed all ticket offices. Ticket sales can be purchased from platforms' vending machines, via Internet or mobile phones.

All interviewees were rather satisfied with the ticketing system and they said there have not been that many challenges. In the beginning understanding the fare system created some challenges. When private railway undertakings entered the market, they had to choose between joint system with DSB or have their own, new system. Due to Danish rules and regulations, railway undertakings decided to get along with DSB and use their system. Private railway undertakings have fare competence on their lines due to the fact the contracts are net-cost. The ticketing system was free of charge, but the company using the machines need to maintain them. Once the tender is over, the ticket machines should be returned back to DSB in the same condition railway undertaking received them.

The status with stations was considered a bit unclear in Denmark. Some stations are owned and maintained by DSB, some by Banedanmark. This causes problematic situations. For example, when railway undertaking hires a station from DSB, they are responsible for maintaining the station, including also outdoor functions like snow removal. Due to contract the responsibilities between the railway undertaking and Banedanmark are unclear, for example snow removal around the station it might belong to railway undertaking, but the platforms should be cleaned by Banedanmark. Interviewees hope to see in Denmark similar system than in Sweden, where one organization (in Sweden Jernhusen) is responsible for most of the facilities. If one actor would be responsible for main part of stations, the market environment would be simpler. The situation is rather vague because stations are not DSB's core competence. When considering the break rooms, all railway undertakings have their own.

5.2.5 Cooperation

In general level the cooperation is really good in Denmark. When new railway undertakings have entered the market, governmental authorities have been helping them in order to get all needed documents done. In educational sector DSB is supporting the current institutions, for example DBS has given the institution an old train wagon where students can practice in more realistic environment.
Although market actors are supporting each other, they also need to show respect to other market actors. When market is changing the railway undertakings need to understand there are also other actors in the field than only the big ones, for example DSB. All market actors should realize and accept that small railway undertakings are also there for the same final target, to provide good service for customers. In respect of cooperation with governmental bodies, it was mainly considered positive. Based on interviewees' personal experiences, the governmental actors are better in Denmark than in other European (e.g. Sweden, Germany, England and the Netherlands) countries. In Denmark railway undertakings can talk with governmental actors, which is really important in order to have a well-functioning market. Also the governmental level has realized the main focus should be on customer, which clarifies the market.

However, some drawbacks were also highlighted. The bigger the organization, the more difficult it is to work with them. This concerns also Trafikstyrelsen and RailNetEurope. Sometimes it is really hard to find the correct person. As a lot of personnel have changed and new people without railway knowledge have entered the governmental bodies, this creates extra work for market's other actors, such as railway undertakings and educational institutions. In the end, having good personal relationships between other actors in railway industry is vital.

5.3 The United Kingdom

5.3.1 General market conditions

One of the peculiarities in the British railway market is the fact that it is heavily concentrated on passenger transport, only 5-10 per cent of traffic on the network is freight transport. According to interviewees there has always been a substantial involvement of private sector in railway freight sector, because often terminals and loading / unloading places are owned by private companies. Because the deregulation process was done decades ago, the market has got used to the situation. Currently the market has several types of organizations in the industry, as some are fully private but with regulation on how they work (including both passenger and freight railway undertakings but with different business models). Network Rail, the infrastructure manager is not-for-profit organization. When considering the market entry, the interviewees mentioned although the market entry barriers hinder the entering process, the British market is rather open for new companies. There is no shortage of equipment; both old and new locomotives can be leased from leasing companies and wagons are available everywhere. Also the fact that there is open access to sites facilitates the entry process. As market entry barriers were unfolded access to network and involved costs and investments (some small scale railway undertakings have underestimated the costs involved and ended up in troubles). Generally new railway undertakings find it hard to compete with big players.

The British rail infrastructure was regarded very different from mainland Europe. The discrepancies concern also other areas related to infrastructure, for example the loading gauge, tunnels etc. During the last decade the infrastructure has improved enormously (not only the tracks but also the structure), as the government invested more to maintain and develop it. The capacity is regarded as the main challenge, because some parts of the network are really crowded. The situation could be facilitated by introducing high-speed passenger lines, which would release capacity for local passenger services and freight transport. When considering the way of making decisions related to infrastructure investments, currently there is a five-year planning cycle, meaning there is clear plan which projects are funded and how it is done for the coming years. Although five years is regarded a bit short time, situation has improved a lot since earlier days when the plans were done for the coming year.

Generally the railway market was considered to function rather well. A lot has happened since deregulation, and development steps have been significant. Especially this concerns the railway freight transport sector, which has increased its market share against road from seven to 11 per cent. Unit costs have decreased and the price the customers are paying is much lower than it was at privatization, so the market has become economically competitive. One area which is lagging behind is

the Channel Tunnel connection to France. It is perceived to create a lot of possibilities due to providing railway connection to mainland Europe, but especially freight sector is confronting great challenges. At the moment the Channel Tunnel is seen as being unique, meaning the same rules which are applied for example in tunnels under Alps is not utilized. If same rules and requirements would be used in Channel Tunnel, most probably the costs of using the tunnel would decrease and increase the share of market. At the moment the Channel Tunnel is underperforming badly, so it is the biggest potential for rail freight in the UK.

Even if the British railway market is functioning rather well, there are few things which are creating challenges. The fact that government bodies are led by politicians was regarded cumbersome. Every time when the ministers change creates problems because information is not properly transferred. In the UK there is a strong regulatory culture in the railway market. The Office of Rail Regulation was regarded to take detailed interest in what happens in the industry. According to interviewees all railway related processes should be speeded up and generally the market should be more driven to service culture. Because railway market is so technical, market attracts a lot of clever technical people who are good in what they do, but they do not have the knowledge to look outwards. This was highlighted as a problem not only in the UK and Europe but across the world. Although interviewees were rather satisfied with European Union's actions, actors highlighted that EU should stop changing things and let things to settle down for a little while. The continuous changing of railway packages was regarded to mix things up. Especially this creates cumbersome situations for railway undertakings, which need to manage the changing rules again and again. In order to have a well-functioning market, few general matters should be kept in mind. According to interviewees the railway sector needs an independent strong regulator, and licenses and safety authorities should be kept away from government. Overall the issues related to money should be made more transparent. Finally, interviewees mentioned the countries should have more power to influence on Commission's decisions. For example, one thing which is causing a lot of frustration in the UK is the noise tests wagons need to undergo. In mainland Europe old-designed bogies are used which are inherently noisy. British market uses the track-friendly bogies which are very quiet, but due to regulations also the new wagons need to undergo the noise test which is really expensive. Therefore railway industry hopes some changes are done to rules as quickly as possible.

5.3.2 Education

In the UK the way to educate railway personnel is rather simple and systematic. Railway undertakings educate the engine drivers themselves. Although various external companies are offering courses, those mainly concentrate on extra courses and training which is given after the basics are known. The competence of employees is really important, wherefore special attention is paid on how the work related tasks are done. For example, in maintenance sector all employees need to go through an extensive number of courses. When starting in a maintenance company, the employee needs to have initial training and induction for safety which lasts two years. Thereafter there are annual re-assessments. This is in order to check the person maintains his competency and skill levels.

5.3.3 Maintenance

The rolling stock maintenance has changed over the years. Before privatization British Rail was responsible also for the maintenance system. In the system called "Commuted Charges" the wagon owners paid some money based on the number of wagons, and in return when wagons needed major overhaul and needed to go to workshop, it was free of charge. When British Rail was privatized, the system was suspended. Because it took few years to change the market, the owners decided the only way to get around the problem was to do more heavy maintenance out in the field, and not send the wagons back to workshops. Therefore, the market confronted a significant change after privatization.

Today some operating companies are doing their own maintenance. According to interviewees among the main challenges is that the maintenance related costs are much more expensive in the UK than mainland Europe. This is mainly due to state-owned railway system, meaning that a wagon operator in France goes to SNCF workshop. In the UK the rolling stock maintenance industry is audited more than almost any other industries. However, overall the maintenance regimes are perceived functional. The market has not seen many new entrants, mainly due to low margins. The only market entrants have been small scale, specialized engineering companies which are operating old British Rail workshops. Usually these companies are offering specialized services mainly for the passenger sector, such as air-conditioning overhaul etc.

5.3.4 Stations and sales of tickets

In the UK the stations can be owned by different actors. Network Rail runs 17-18 biggest stations, for example St. Pancras International station in London. The reason behind such a model is that often the biggest stations have multiple users, and the performance of the station is critical when considering the whole national network. Therefore, the stations are considered as major strategic assets. Other station owners are the railway undertakings, who own around 2000 stations across the country.

Considering the tickets, there are two types of tickets, interoperable tickets and tickets for certain railway undertaking. Interoperable tickets, the ones which are valid between the origin and destination, are valid on any railway undertaking by any valid groups. Another option, tickets for certain railway undertakings' trains have become more popular. Because tickets are only valid on their services, the company receives all revenues. Often railway undertakings are offering such tickets with a cheaper price because some percentage (around eight or nine per cents) of interoperable tickets' sales goes to seller of the ticket. Therefore, if you buy a ticket from railway undertaking and it is only valid for their services, they get 100 per cent of sales. What should be improved in ticket sales is the number of tickets sold on-line. Although people are using Internet, cardboard tickets are way too common. This is expected to change in the future.

5.3.5 Cooperation

British railway secor has good level of cooperation. Especially smaller freight railway undertakings tend to work closely together, which strengthens their role on the market. On the contrary, one interviewee said the relationships are nearby as close as they could be, so the things still have room for improvement. According to

interviewees a bit more spirit of cooperation is getting back. British Rail created long-term relationships which have been partly gone after privatization; now some of it is coming back. Companies have realized they need to work together for a common goal and look at the whole railway industry. Railway undertakings cannot become successful alone, because all actors are reliant on others. Recently the market has seen more cooperation, for example if some railway undertaking has shortage of locomotives, some competitor can hire locomotives to them –most probably for very high price, but earlier this would not have happened. Railway industry seems to have understood that in order to improve the sector, its performance needs to focus on customer service and providing better service. Collaboration has extended also to freight customers' level, as there has been some examples about trying to get customers who would normally compete (e.g. grocery stores) to share space on freight trains. The competing companies do not need to contact each other, but there are third party logistics service providers offering rail transport services. That has been quite successful for fast moving consumer goods. Nevertheless, the market still has a lot to develop before it is functioning well and is really able to compete with road sector. In the end all market actors should remember who the final customer is.

When contemplating the governmental level, the regulatory side works rather well. The cooperation and overall level of actions could be improved if Department for Transport would be less involved. According to interviewees they should be more strategic and concentrate on setting the agenda, and leave the industry and regulatory authority to get on with the details. Government should be more consistent and have a clear objective. Currently they keep changing the objective depending on coming regulations, which complicates especially small railway undertakings' actions.

6 Discussion

The railway deregulation trend initiated in 1980s and has been around for few decades. During the process the markets have confronted various changes. In Europe the progression of deregulation has proceeded differently between the countries. Among the first countries to deregulate the railway markets were the United Kingdom, Sweden and Germany, and even in these market areas the process happened dissimilarly. The UK went for the radical way and liberalized the whole market at once, while Sweden proceeded more incrementally. The influences are on display today. Although the British railway market confronted severe problems in 1990s which led to breakdown of Railtrack and establishment of Network Rail, the situation has improved during the last decade. Currently the market is functioning well: Although there are issues to deal with considering the infrastructure, general condition of infrastructure (meaning both tracks and structure) has developed significantly. Because the market has been open for competition for such a long time (both passenger and freight sectors), all actors are well acquainted with the conditions and therefore have adequate knowledge to act on the market. Same types of factors are visible in Swedish market, but the fact that Sweden deregulated the passenger sector just couple of years ago has a great influence on the matter. Capacity was regarded to create some cumbersome situations in the UK, but the Swedish situation is classified troublesome. The number of railway undertakings has increased significantly and all the possible rail capacity has been granted for traffic operations. This has led to a situation, where there is no rail capacity available for infrastructure maintenance work. A maintaining work which used to take few weeks can currently take months, because there is no possibility to do it at longer shifts. Especially the fact that in Sweden the same network is used for passenger and freight traffic is cumbersome – passenger trains are running on daytime while freight trains take the floor on nights, so there is no time available for maintenance. Naturally the location of Sweden does not help the situation, as the harsh winters create extra challenges for the infrastructure.

The needs for improving the infrastructure were also stressed in Denmark, which otherwise differs a lot from the other case countries, Sweden and the UK. One of the main problems in Denmark is the fact that only small part of network is electrified, wherefore railway undertakings need to utilize a lot of diesel locomotives. In order to make the market more environmentally friendly and generally improve the market, actors are hoping for new electrifications. Government has taken notice on this and the situation in Denmark will be improved during the coming years. Otherwise the status of Danish railway market is quite different than the counterparts in Sweden or the UK. While these two have deregulated both freight and passenger markets to some extent, in Denmark the internal passenger market is still regulated (private railway undertakings can enter the market via tendering) and only the freight sector is fully open for competition. The passenger sector has some operators, but many of them are small-scale private railway undertakings operating regionally on their own network. The fact that two larger railway undertakings have entered the market via tendering processes has had a great influence on the market structure. The invitation to tender document describes rather carefully the market conditions, which facilitates the market entry process. Therefore, railway undertakings entering the market via this way confront the situation differently than the counterparts in other countries where they need to deal with all matters by themselves.

Although the countries have proceeded differently while opening the railway markets for competition, some similarities do exist. In all countries the main competitor for railway transport is road, both in passenger and freight sectors. Danish culture is known for using a lot of bicycles, which was unfolded also in this study. Interviewees in all three countries said that the general attitude towards public transport had improved; whether it is due to European Union's regulations to increase the utilization of public means of transport or something else, it is hard to say. The markets seemed to have understood that without the customers demanding public transportation, there is no need for it and therefore no need to offer rail-related services. This has led to improved customer service and quality. Albeit the level of service has improved, the fact that many employees have background in the incumbent was emphasized to hinder the process of learning new corporate cultures. While people working in railway industry are retiring and new generation is stepping in to the market, some changes are expected. Although this is considered as a positive thing, it also has drawbacks. Great amount of tacit knowledge disappears with old employees, which can lead to situation where new employees do not have an adequate level of knowledge. This has caused some problems for example in Sweden. In the end it all comes down to people: Personal relationships between the actors in railway industry are really important, as people create the market. Generally the atmosphere in all three countries' railway markets were regarded good which creates possibilities for further developments. Another important possibility was noted in the UK, where the Channel Tunnel, railway connection to mainland Europe, was noted to offer great possibilities especially to freight sector. Currently the connection is not functioning as well as it should, wherefore the market is waiting for improvements.

Education is organized differently in Sweden, Denmark and the UK. In Denmark the system was changed once the first private railway undertaking entered the market via tendering process. During the process it was realized that a market structure where only the incumbent is offering the basic education is not functional due to competition arrangements, wherefore the education was given to public sector. Although the change created some problems in the beginning, currently the market is rather satisfied with the situation. The institutions have cooperation with the old incumbent and they are supporting each other in educational sector. In addition to education provided in vocational schools, all railway undertakings are giving further training to their employees. This especially concerns the engine drivers, who need to have adequate knowledge to drive different kind of locomotives. In Sweden there are several educational institutions offering railway education. Earlier Järnvägsskolan was the only educator, but since privatization many new institutions have entered the market. Among them is Transport Competence Center, which has become the largest educator of engine drivers in Sweden. One of the differences between the Swedish and Danish markets is also the fact that in Denmark you first need to be employed by a railway undertaking before you can enter the institution, but in Sweden there are different paths to enter. Railway undertakings can send their employees to courses, youngster can enter the institution like any other vocational school or the unemployment office can point the education to unemployed person. In the British market the people are mainly educated in-house and companies are in charge of training their own engine drivers. The market related to institutions offering special courses in railway matters (for example safety) is enlarging, as many organizations are offering education.

The main similarities when considering the rolling stock maintenance are noted in Sweden and the UK. In both markets some private railway undertakings are doing maintenance in-house in their own depots, but there are also external rolling stock maintenance companies offering services. These companies are normally concentrating only on maintaining the rolling stock, they are not railway undertakings. Swedish market has one of the largest maintenance companies in whole Europe, EuroMaint, which used to be incumbent's rolling stock maintenance company. In addition, Swedish maintenance market has attracted few other actors. According to results although the market has versatile fleet of companies offering the services and for sure there is competition, the market is functioning well and all actors are happy with the situation. In the UK some companies are doing their own maintenance, for example the largest freight operating company has the maintenance in-house. The market has some number of rolling stock maintenance service providers, but mainly those are operating in niche markets offering services to certain kind of customers. In Denmark the situation is totally different, as due to taxation the railway undertakings are doing maintenance themselves in their own depots. This way companies can save the value added tax, which is 25 per cent. In all three countries infrastructure was noted to create challenges. In Sweden the winter conditions have influence on wheels, while in the UK the companies are having troublesome situations due to European Union regulations. British railway market differs quite a lot from mainland Europe, but due to regulations they need to act alike Central European countries. In Sweden the railway market actors hope to see a pool, which would be in charge of selling the high-cost components and tools. This would increase the competitiveness of the industry.

Interestingly, Danish and British markets have same kind of system in sales of tickets. Both countries have introduced two types of tickets, one which is valid in all trains no matter who the operator is, and the other one which can be used only in certain trains. Flexibility increases the price but it enables the passenger to choose whatever train he/she wants to take. On the other hand, company specific tickets are sold with discount, which can attract passengers to certain trains. The system is regarded to function well. Swedish market is confronting challenging situations due to ticket system. Several new railway undertakings have entered the market, and they all have their own ticketing system. Basically this means, that if a passenger for some reason misses the train, in some cases he/she cannot use the same ticket to the next train coming because it is operated by another railway undertaking. This is creating a lot of complications as passengers normally do not understand the difference between the railway undertakings. The troublesome market structure has negative influence on the market, as passengers might easily choose car instead of train because it feels easier. Therefore the Swedish railway sector actors wish to see changes in the near future.

When considering the ownership structure of stations, the ways to organize the market differs between Sweden, Denmark and the UK. In Sweden the part of old incumbent, Jernhusen, is in charge of most of the stations and terminals. This was considered both as a positive and negative matter. Interestingly, Swedish actors stressed the model where Jernhusen owns main amount of stations and terminals is functioning rather well but they still hoped for changes. On the other hand, Danish market regarded Swedish example a good one, due to the fact that in Denmark both Rail Net Europe (Banedanmark) and incumbent DSB own stations. As the ownership structure is vague, railway undertakings get confused about the correct parties responsible for stations and areas around the stations. In the UK Network Rail

possesses the major stations, which are noted critical to country's network. This is due to the fact that when many railway undertakings are using the same stations, the network could be easily interrupted if managing would be done poorly. The way to handle things has been rather successful, and companies are satisfied with the structure.

The cooperation is becoming more and more important, also in railway industry. Railway undertakings have realized that in order to enhance the situation in railway market, they need to work together for a common goal. Although railway undertakings are competing with each other, especially during tendering processes, otherwise help is offered for the counterparts if it is needed. Naturally in all market areas there are always companies who are not that keen on doing cooperation (mainly these companies are the big players). This was not regarded a problem because the number of other actors has increased. The importance of personal relationships was unfolded in almost every interview. When having good relationships with people in railway industry, matters which might be hard to handle seem a lot easier. The fact that earlier many persons working in railway industry had a background from same company (incumbent) was a cut out for cooperation. Currently new generation is entering the railway market, which is changing the market structure. New relationships are made between the newcomers so field of cooperation is changing but not disappearing. Cooperation with governmental actors received diverse comments. In Denmark the governmental bodies were considered really good and helpful, it was even stated that they are the best ones in Europe when it comes to giving information and offering help with matters related to documentation etc. Even though generally the governmental actors were considered to function rather well in the UK, less involvement of governmental actors was hope for. The most problematic situation was unfolded in Sweden. According to the results the actors of the market have a feeling that governmental bodies are not sure who is responsible for what. Therefore receiving adequate information was sometimes impossible. Both the British and Swedish markets were stressed to have a situation that no one is really in charge of the market. Especially this problem was unfolded in Sweden, where actors wish to see someone who would be responsible for the whole market. Now everyone are doing what they feel like, which can lead to dramatic results.

7 Conclusions

7.1 Summary and Main Findings

This study has provided insights into the organization of rail-related services in three deregulated railway markets, Sweden, Denmark and the United Kingdom. The main purpose of the study was to research how the rail-related services are organized after the liberalization, which was scrutinized via literature analyses and brought to empirical level by evaluating experts' viewpoints. In order to fulfil the level of knowledge and assure an exhaustive understanding, before going into the rail-related services the progression of deregulation was identified and studied.

Study's empirical data was gathered by utilizing semi-structured theme interviews. Additionally, extensive literature analyses and second-hand data brought the quantitative touch to the study. Qualitative case study analysis was chosen as a research method because the data needed for responding the research questions was qualitative by nature. Eisenhardt (1989) highlighted qualitative case study analysis is a recommended way to gather data when studying novel topics, as was the case in this research. Altogether were done 15 interviews, seven in Sweden and four in both Denmark and the UK. In four places two interviewees were present. The sample gathered from case countries consisted of five railway undertakings, four educational institutions, four rolling stock maintenance providers and two governmental actors.

Railway deregulation has been inspiring research worldwide during the last decades. Among the first countries to deregulate the markets were the United States, Japan, Sweden and the UK, which explains why most of the studies concentrate on these countries. Although freight sector was liberalized earlier and therefore has attracted more studies, researches related to passenger sectors' development have been increasing. Rail-related services, the services which are supporting the operations (for example rolling stock maintenance, education, organizing the stations and ticket sales) have been evaluated only in few studies. This study tackled the gap by scrutinizing the situation in rail-related services by utilizing the viewpoints from grass-root level, the experts' who are active in the market. Therefore first-hand data gathered via interviews can be seen as attenuating the existing empirical gap.

Deregulation has proceeded quite differently in all three case countries, Sweden, Denmark and the UK, which has had a direct influence on organizing the rail-related services. Although Sweden and the UK were among the first countries to deregulate the markets in 1990s, the markets have clear discrepancies. The British market progressed radically by deregulating and privatizing whole market, including railway infrastructure, freight and passenger operations as well as rail-related services. Sweden started the process incrementally from the freight sector, and continued it step by step to passenger sector. Although some tenders were given out earlier and the incumbent lost its monopoly in night trains in 2007, market was opened for competition only couple of years ago. In Denmark only the freight sector is deregulated, while passenger sector has gained new railway undertakings via tendering processes. Additionally, a Danish peculiarity, private railway undertakings operating their own regional network should not be forgotten. The background and status of deregulation has a direct influence on organizing the rail-related services.

Albeit the Swedish market has confronted significant development during the last decade, railway industry is elaborating all the time. Railway undertakings have more options to organize the rolling stock maintenance since new private companies are entering the market. Although Swedish market has one of the largest maintenance companies in Europe, the smaller scale firms are doing rather well. Additionally small private railway undertakings are doing their own maintenance, so the market has all different kind of actors. In railway education sector Sweden belongs to really advanced countries in the Europe. In addition to old school which has been offering railway education for decades, new educational institutions have been established. The newcomers are doing really well, and one of those has become the major educator of engine drivers. The most cumbersome situations in Swedish market are noted in ticket sales. All railway undertakings have their own tickets, which creates problematic situations for the passengers. In order to have a well-functioning market which attracts new passengers, the structure of ticket sales should be carefully considered. Swedish market could follow for example the Danish way of organizing the market. In Denmark there exists both the interoperable ticket which is valid in all railway undertakings' trains, as well as company specific tickets which are sold at a more reasonable price. The Danish market has been satisfied with the structure, and it is highly recommended also for Sweden. Otherwise the rail-related services are organized totally different way in Denmark. All Danish railway undertakings are doing rolling stock maintenance in-house, due to taxation. If railway undertakings would outsource the service they should pay 25 per cent value-added tax, which is exempt from transport operations. Therefore railway undertakings have own maintenance facilities and personnel to do the maintenance. The way to organize the railway education was changed when the first private railway undertaking entered the market via tendering process. Today there are two public schools which are in charge of educating all engine drivers. In order to be accepted to the school the person needs to be employed by a railway undertaking. In the UK the status is totally opposite, as the engine drivers are educated in the companies. Market has some institutions offering specialized courses, but the basic education happens in-house. The maintenance in the UK follows the Swedish way. Some railway undertakings are doing maintenance in-house, but market has few rolling stock maintenance companies. Many of the companies are niche actors, but few have a nationwide cover. The British ticketing system has similarities with the Danish one, the market has an interoperable ticket as well as companies are offering specific tickets. Flexibility costs more, so passengers wanting to save in expenses can choose a discount ticket from a certain railway undertaking. Also this sector was noted to function well. Customers are well aware of the market structure and are satisfied to have a choice.

Although the process of deregulation and therefore organizing the rail-related services differ from country to country, the main confronted challenges have been more or less the same throughout the countries. In maintenance sector the availability of high-cost components and needed tools, access to infrastructure and possibility to utilize maintenance depots have been noted the major issues. Especially the Swedish market was requesting for a joint pool, which would deliver the high-cost components and tools to market actors. This might be due to the fact that new companies have entered the maintenance market during the last few years, and although the market is functioning rather well, the overall structure is not totally clear. The educational sector has confronted the change rather well. In Sweden the market has welcomed the new educational institutions with glad-hand, as they are noted to offer new possibilities to the market. In Denmark some discussions were

going on during the change period, but after actors realized the educational market is functioning well, the discordant notes have quietened down. As the British way is still to educate the persons in-house, this has not been noted as a challenge.

Railway market deregulation has had a positive impact on rail-related services. In all market areas the deregulation process has been the basis for the new market. Several actors offering rail-related services have been established after the privatization, because they noted there was demand for such a services. Companies operating both in maintenance as well as education sectors have been satisfied with the development. Markets are functioning well and companies are doing fine. The situation is a bit different in Danish market which is a bit more closed in a sense that maintenance is done in-house and education is offered only in two public schools. However, the actors of railway market thought the rail-related services are in a good level.

The market deregulation has had an influence on interest groups' cooperation. In all three countries many of the industry's employees have background in the incumbent, wherefore people widely know each other. Although this facilitates the cooperation, it might have negative aspects. Often incumbents have really strong organizational culture, and people easily continue to act the same way when changing the workplace. When persons who have been colleagues for decades suddenly become competitors, it might hinder the collaboration. Once new employees have entered the market the situation has changed, and most probably will improve in the future. Once the markets get more mature the level of cooperation also changes. This has been unfolded especially in the UK, where the market actors have realized in order to make the industry function well, they need to work for the common goal. Railway undertakings and other actors are supporting each other in difficult situations, which create positive energy to the market. Therefore can be highlighted, that market deregulation has had positive influence on the level of cooperation.

In all three countries, Sweden, Denmark and the UK the future possibilities relate to the infrastructure and overall market conditions. While the network is getting more crowded due to capacity allocation and increasing number of railway undertakings requesting for capacity, special attention should be paid on bottlenecks and improving the traffic flows. Especially large infrastructure projects are underway in the UK, where both the London area as well as countrywide strategic freight networks are receiving a lot of attention as well as funding. High-speed lines are highly hoped for in the UK, as those would release the capacity for local passenger operations and freight transport. In Denmark the main improvements relate to ERTMS and increasing the electrified network, which will develop the whole market to greener direction. In Sweden among the main infrastructure investments is the Stockholm City Line, which will double the track capacity in Stockholm. The general market conditions are also providing possibilities in the future, because based on all evaluations the growth of railway sector will continue. Once more freight is transported via railway and more passengers are utilizing trains, the markets are evolving. In order to fulfil the requirements of evolving markets, special attention needs to be paid on rail-related services. Without good supporting functions the operational market cannot reach the optimal goal.

Reflecting the results to Finnish market

Because the Finnish railway market is still rather immature and changes will be confronted in the future, several things could be learnt from Swedish, Danish and British markets' experiences. As a good and effective way to introduce new railway undertakings to passenger market is the tendering process. This model is used for example in Denmark, and all actors seemed to be satisfied with the progression. The document "invitation to tender" describes all needed functions (stations, maintenance, break rooms etc.) and it is regarded as a simple way to enter the market. This could be an option also for Finland. Once new railway undertakings enter the market and start the traffic, in order to ensure good condition of infrastructure it is vital to perceive the time need for infrastructure maintenance. Especially in Sweden the infrastructure's condition is lagging behind, because capacity is so tightly granted that there is no time to do the needed preventive maintenance. Another important topic is the ownership structure of stations and terminals. A clear model is needed, stating that all actors in the market are aware who is responsible for certain matters. Currently in Denmark both DSB and Banedanmark own stations, which create problems. Although the Swedish model received some drawbacks, Danish saw the model more functional than their structure.

According to earlier studies (see for example Laisi, 2009) among the greatest market entry barriers are needed investments and acquiring of rolling stock. Currently the capacity is only granted for one year at the time. If railway undertaking receives a contract for one year, it is almost impossible to buy the rolling stock because the future is unknown. As a solution was mentioned a pool, which would own all rolling stock and lease it to railway undertakings under the same market conditions. This would increase the level of market fairness and transparency, as all railway undertakings wanting to operate in the market would have the same starting point. Railway undertakings should differentiate with for example customer service, which could attract new passengers. The research unfolded that all market actors, including railway undertakings and governmental bodies, should remember who the final customer is. The passengers need to be persuaded to transfer from road to rail, which is possible only if the customer feels he / she gets value for money. This includes both the ticketing prices as well as other related topics, for example the passenger information. Based on this study can be noted, that a ticketing system having two types of tickets seems to be the most attractive one. In the system (which is used for example in the UK and Denmark) the passenger can choose between interoperable ticket which is valid in all railway undertakings' trains, or a discount ticket, which can be used only in certain railway undertaking's traffic. Flexibility costs money, but passengers have been satisfied with the system. Concerning the passenger information, as trust is among the main functions when attracting new passengers, special attention should be paid on information given to passengers.

Among the vital functions in railway market is organizing the education. In Sweden new educational institutions entered the market once they noted there was demand for extra education. In Denmark after the first tender process was noted that due to competition arrangements it was impossible to organize all education under the educational institution run by the incumbent. This is still today the situation in Finland. In order to facilitate the entry process of new railway undertakings and ensure the availability of engine drivers for new-comers, it is important to remove the education from incumbent. In Sweden was noted that in order to ensure high-level education throughout the country, offering education only in one location is not

enough. Some institutions are offering education in several locations, or if possible, they are giving lectures in railway undertakings' premises. When considering the size and length of Finland, it can be assumed that similar problems than confronted in Sweden will be faced in future. According to Fraser Institute study Finland was regarded as the world's second attractive target for mining industry (TEM, 2012)); if the mining industry takes off, this will have direct impact on the Finnish railway sector. Example can be seen in Sweden, where LKAB Malmtrafik is a large-scale railway freight undertaking only transporting iron ore. If the railway transport volumes increase in North Finland, at some point education should be offered also in northern part of the country. When considering the rolling stock maintenance, according to this research the best model is to have several types of possibilities available. If railway undertakings want to maintain the fleet themselves it should be possible, but there could be a market for companies offering only rolling stock maintenance services.

Generally, based on the research deregulation has increased the volumes, developed the markets and increased the engine drivers' salary levels. Some side-effects can also be noted. If special attention is not paid on granting the capacity, rail network can become too full. This means there is not time to do the maintenance. Although increased amount of competitors is highlighted a good factor in several studies, based on this study the markets have certain limit where after there is no room for all new-comers. Some think this might be confronted in Sweden, as few railway undertakings have bankrupted or merged with larger railway undertakings. Similar model is also seen in Central Europe, where for example Deutsche Bahn is acquiring smaller railway undertakings. However, in some scale competition is good for the railway sector. In order to have a well-functioning market, it is important that someone takes the whole responsibility. This means that an individual steering body should be established, which would oversee the whole market environment.

7.2 Limitations and Suggestions for Further Research

Certain limitations should be kept in mind when interpreting the results of this research. The findings are from three different countries. All three markets have proceeded differently when it comes to deregulation, and the three countries have own characteristics which might influence the end results. Although different actors and stakeholders from the railway industry were interviewed, study cannot generalize that results would represent the whole industry's opinions. Although interviewees were located around the countries and therefore also the countryside's ideas are unfolded, if more actors would have been met, some other themes might have appeared. In main part of the interviews only one person per organization participated, and therefore his / her opinions represent the standpoints of the whole organization. Persons cannot always remember all facts and figures, and personal opinions might be unfolded more clearly than company's standpoints. All interviewees were in managerial or such a position, which might have an effect on the results. Even though the concentration was not on either the freight or passenger market, more attendants represented passenger sector. Finally, it could be interesting to repeat the research after few years, in order to see how the markets are progressing and how many organizations offering rail-related services are operating in the market.

Research's reliability was confirmed by recording all interviews. This way was ensured the availability of information for further re-checking if something seemed unclear. All interviews were transcribed and the minutes were sent for interviewees for checking. Although all expect one interview was done in English, this way was confirmed the interviewer understood the answers correctly. Furthermore, interviewees got a chance to recheck the given information, and for example give further information related to numerical data. Careful description of the analyzing process increases the reliability. Same kind of questionnaire base for the interviews than in previous researches was used to confirm the validity.

Although the deregulation of railways has been widely studied from different angles, in order to understand the future prospects the research need to be continued. This research tackled the rail-related services, which are pivotal for whole railway industry. The research could be taken to a deeper level by investigating how things have proceeded in other countries. For example, interesting viewpoints could be received from the United States, Japan, or Western Europe. Furthermore, as maintenance of railway infrastructure seems to be among the main challenges, a study concentrating on how maintenance is organized in number of countries could unfold interesting viewpoints.

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Open your mind. LUT.
Lappeenranta University of Technology

Liikennevirasto
Finnish Transport Agency

xx.xx.2012

Dear Recipient

A STUDY OF ORGANIZING THE AUXILIARY ACTIVITIES OF RAIL TRANSPORT IN CHOSEN EUROPEAN RAILWAY MARKETS

The structure of European railway market has changed during the last years, due to deregulation of freight market in 2007 and international passenger market in 2010. In addition to changing the operating environment, deregulation has created various challenges to railway industry. Railway undertakings need several services in order to be able to operate in the market; such services include for example maintenance, ticket sales, education, employees' break rooms etc. Although several countries have proceeded in liberalizing the markets already earlier (Sweden started the process in late 1980s), the Finnish market is still operated by one railway undertaking, the incumbent. However, the situation might change in the near future. In order to facilitate the starting process of new market structure, examples are gathered from countries, which have experienced process already earlier (and therefore have considerable knowledge at hand).

The main intention is to study how the auxiliary services are organized in deregulated markets. Interview study concentrates on confronted changes as well as future prospects and challenges in two countries, Sweden and Denmark. Additionally, few interviews are done in UK, in order to get viewpoints from market, which was deregulated already decades ago. Although the concentration is on passenger sector, also railway freight market is briefly examined. Research is done jointly with Lappeenranta University of Technology, Kouvola Unit, Finland and the Finnish Transport Agency. The academic advisor is Prof. Olli-Pekka Hilmola from Lappeenranta University of Technology, Kouvola Unit. Other advisor is Kaisa-Elina Porras from the Finnish Transport Agency. Additionally, the research provides data for Lappeenranta University of Technology, Kouvola Unit's own academic interests, concentrating on railway market deregulation and functions related to the topic.

Sweden opened the passenger rail market in 2010, Denmark partially in 2002 and UK already in 1990s. Today all markets have several private railway undertakings as well as companies offering auxiliary services. The study's intention is to understand the special characteristics of the auxiliary markets in deregulated rail market context. Your company has a strong experience in the UK market and therefore Your contribution to this research is highly appreciated. The interview is important part of the research project as it gives valuable information how the railway liberalisation affected the auxiliary services at actor level. Your company's experience and gained knowledge would help to gather genuine information. In return for participating in the research you will receive the final report published in the Finnish Transport Agency's series by e-mail.

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Appendix 1

Open your mind. LUT.
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Liikennevirasto
Finnish Transport Agency

The interviews will be conducted in UK in April 2012. The interview takes one to two hours. I would appreciate to receive Your confirmation of interest via e-mail to address milla.laisi@lut.fi. Thereafter we can arrange a meeting for an interview.

Sincerely Yours,

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Liikennevirasto
Trafikverket

xx.xx.2011

Bästa Mottagare

EN STUDIE OM ORGANISATION AV SERVICEVERKSAMHETEN AV JÄRNVÄGSTRANSPORTER I UTVALD EUROPEISKA JÄRNVÄGSMARKNAD

Uppbyggnaden av den Europeiska järnvägsmarknaden har förändrats under de senaste åren till följd av fraktmarknadens avreglering under 2007 och den internationella passagerarmarknaden under 2010. Förutom att ändra verksamhetsomgivningen, har avregleringen skapat olika utmaningar för järnvägsindustrin. Järnvägsföretag behöver fler tjänster för att kunna verka på marknaden. Dessa tjänster omfattar exempelvis underhåll, biljettsystem, utbildning, vilorum för anställda. Trots att flera länder redan har avreglerat järnvägsmarknaden (Sverige startade processen i slutet av 1980-talet), så drivs den finska marknaden fortfarande av ett järnvägsföretag, det gamla monopolföretaget. Den här situationen kan dock förändras inom en snar framtid. För att underlätta processen med att utveckla den nya marknadsstrukturen, så samlas exempel in från länder som redan genomgått processen (och därför har stor kunskap).

Syftet med studien är att undersöka hur olika typer av extratjänster är organiserade på avreglerade marknader. Intervjustudien fokuserar på upplevda förändringar samt framtidsutsikter och utmaningar i två länder, Sverige och Danmark. Dessutom genomförs några intervjuer i Storbritannien, för att samla in synpunkter från en marknad som avreglerades för årtionden sedan. Även om fokus ligger på passagerarsektorn, så studeras även fraktmarknaden. Forskningen sker i samarbete med Kouvola forskningscentrum vid Villmanstrands Tekniska Universitet i Finland och den finska Trafikverket. Den akademiska handledaren är professor Olli-Pekka Hilmola från Villmanstrands Tekniska Universitet. Andra rådgivare är Kaisa-Elina Porras från Trafikverket. Dessutom ger forskning tillgång till data för Kouvola enhetens egna akademiska intressen, som koncentrerar sig på järnvägsmarknaden avreglering och funktioner relaterade till ämnet.

Sverige öppnade järnvägsmarknaden för passagerare under 2010, Danmark delvis under 2002 och Storbritannien redan på 1990-talet. Idag har marknaderna flera nya aktörer samt företag som erbjuder stödtjänster. Målet med projektet är att förstå de speciella egenskaper som extramarknaderna har konfronterats med efter privatiseringen. A-Train har en stark erfarenhet av den svenska järnvägsmarknaden och därmed är Ert bidrag till den här forskningen mycket uppskattat. Intervjun är en viktig del av forskningsprojektet eftersom den ger värdefull information om hur avregleringen av järnvägarna påverkade marknaden för extratjänster på skådespelarnivå. Ditt företags erfarenheter skulle bidra till att samla in viktig information. I gengäld för att delta i forskningen kommer du att få den slutliga rapporten som kommer att publiceras i den finska Trafikverkets serie, via e-post.

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Appendix 2

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Intervjuerna kommer att genomföras i Sverige under januari 2012. Intervjun tar en till två timmar. Jag skulle uppskatta att få din bekräftelse av intresse via e-post till adressen milla.laisi@lut.fi. Därefter kan vi boka in ett möte för intervju.

Med vänliga hälsningar,

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Contacted companies in Sweden

Company	Internet-address
Maintenance companies	
Euromaint Rail	http://www.euromaint.se
Mantena Sverige	http://mantena.se
Midwaggon	http://www.midwaggon.se/
mgw Service	http://www.mgwservice.de/
Educational institutes	
Järnvägsskolan	http://www.jarnvagsskolan.se
TCC	http://www.tcc.se
Mjölby Yrkeshögskola	http://www.mjolby.se/9036.html
Stiftelsen för Kvalificerad Yrkesutbildning i Mellansverige	http://www.skyframtidsutbildning.com/
Operators	
Tågkompaniet	http://www.tagkompaniet.se/
SJ	http://www.sj.se/
Veolia Transport Sverige	http://www.connex.se
A-Train	http://www.atrain.se
Others	
Jernhusen	http://www.jernhusen.se

Contacted companies in Denmark

Company	Internet-address
Maintenance companies	
DSB Vedligehold A/S	http://www.dsb-vedligehold.dk/
Educational institutes	
CPH West	http://www.cphwest.dk
EUC Sud	http://www.eucsyd.dk/
Operators	
Arriva	http://www.mitarriva.dk/
DSB	http://www.dsb.dk
Lokalbanen	http://www.lokalbanen.dk
Regionstog	http://www.regionstog.dk
DSB Øresund	http://dsboresund.dk/

Contacted companies in the UK

Company	Internet-address
Maintenance companies	
Davis Wagon Services	http://www.whdavis.co.uk
Wabtec Rail UK	http://www.wabtecrail.co.uk/
Educational institutes	
University of Westminster	http://www.westminster.ac.uk/
Operators	
DB Schenker Rail	http://www.rail.dbschenker.co.uk/
Southern	http://www.southernrailway.com/
Others	
Network Rail	http://www.networkrail.co.uk/

The semi-structured questionnaire / HETUKI

Service providers

1. *COMPANY INFORMATION*

- History & background information
- Kindly describe your company's services.
- Additional information

2. *ENTERING THE RAIL-RELATED SERVICE MARKET*

- Why your company decided to enter the market?
    - What was the main reason to start the business?
- Kindly describe the situation when your company entered the market
    - Market entry barriers
    - Confronted challenges or difficulties
        - How those were handled?
    - Positive matters
- Where you gathered the personnel?
    - Previous experience
    - Qualifications
    - Training
- Company's strengths and weaknesses

3. *MARKET ENVIRONMENT*

- Kindly describe rail-related service market in the country
    - How the rail-related services are organized?
    - Based on your experiences, is the way of action functional? Why?
        - If not, kindly describe what should be changed.
- What was the situation in the market before your company was established?
- What has changed during the last decade?

- What kind of expectations you had concerning the demand?
- How you predict the needed resources? Is there any difference between summer / winter season, weekends / weekdays etc.?
- How invoicing is organized (contract type)?
- Pricing
    - Kindly describe the pricing.
    - What is the ground for pricing?
    - Has price level changed during the years?
- Do you advertise? If yes, which advertisement types are used?
- When considering the related services, are there differences between commuter and long-distance operations? If yes, what kind of differences? How you see the situation in future?

- Level of competition
  - Does the market have free competition? Proposals how to increase the level of competition.
- Who is your main customer? What kinds of contract types are used?
- Infrastructure
  - Does the infrastructure's condition create challenges / possibilities to your operations?
  - Infrastructure's strengths & weaknesses
  - Development ideas
- European Union
  - What is your opinion about European Union's regulations related to rail market / your own market area?
  - What kind of challenges or possibilities EU regulations are creating?

- Do you think some improvements are needed in the market? If yes, what kind of improvements?
- Development ideas & future prospects

4. *COOPERATION WITH OTHER ACTORS IN RAILWAY MARKET*

- Kindly describe your cooperation with other actors in railway market
  - Governmentally owned railway undertakings
  - Infrastructure managers
  - Private railway undertakings
  - Other service providers (e.g. maintenance)
  - International companies (service providers, railway undertakings etc.)
- Does the cooperation have negative aspects? If yes, kindly describe.
- When considering cooperation with others, which topics should be developed?

5. *GOVERNMENTAL BODIES' ACTIONS*

- Kindly describe your cooperation with governmental regulating bodies.
  - Have you had cooperation / common cases?
  - Are certain specific certificates / documentation needed? Has it created challenges?
  - If questions arise, how easy it is to get help from governmental body?
- Kindly define the confronted strengths and weaknesses when dealing with governmental bodies?
- Have you faced cumbersome situations, which have needed the help of governmental organizations?
- Development ideas

The semi-structured questionnaire /HETUKI Operators

6. *COMPANY INFORMATION*

- History

7. *ENTERING THE MARKET*

- Why your company decided to enter the market?
    - What was the main reason to start the business?
- Kindly describe the market entry process
    - Market entry barriers
    - Confronted challenges or difficulties
        - How those were handled?
    - Positive matters
- Where you gathered the personnel?
    - Previous experience
    - Qualifications
    - Training

- What is the situation today related to education: How your company ensures the staff has received adequate training?
- Company's strengths and weaknesses

8. *MARKET ENVIRONMENT*

- Kindly describe rail-related service market in the country
    - How the rail-related services are organized?
    - How your company's services (e.g. maintenance, ticketing and break rooms) are organized?
        - Do you buy services outside or are you self-sufficient?
    - Based on your experiences, is the way of action functional? Why?
        - If not, kindly describe what should be changed.
    - What has changed during the last decade?

- Concerning rail-related services, how you predict the needed resources? Is there any difference between summer / winter season, weekends / weekdays etc.?
- How invoicing is organized (contract type, or inside company)?
    - Has price level changed during the years?
- Based on your experiences, what are the main grounds for pricing? (E.g. transparency, fairness etc.)
- When considering the rail-related services, are there differences between commuter and long-distance operations? If yes, what kind of differences? How you see the situation in future?

- Level of competition
    - Does the market have free competition? Proposals how to increase the level of competition.

- Infrastructure
  - Directive 2001/14/EC divides services to be supplied to the railway undertakings to four parts. The first part is "the minimum access package", including
    a) Handling of requests for infrastructure capacity;
    b) The right to utilise capacity which is granted;
    c) Use of running track points and junctions;
    d) Train control including signalling, regulation, dispatching and the communication and provision of information on train movement;
    e) All other information required to implement or operate the service for which capacity has been granted.

    Based on your experiences, how well these services are functioning?
  - Does the infrastructure's condition create challenges / possibilities to your operations?
  - Infrastructure's strengths & weaknesses
  - Development ideas

- Kindly describe who is responsible for following subjects / how following subjects are handled in your country
  - Railway yards, equipment in railway yards
  - Traffic control services
  - Electricity

- Do you think some improvements are needed in the rail-related service market? If yes, what kind of improvements?
- European Union
  - What is your opinion about European Union's actions related to rail-related service markets?
  - What kind of challenges or possibilities EU regulations are creating?

- Development ideas & future prospects

9. COOPERATION WITH OTHER ACTORS IN RAILWAY MARKET

- Kindly describe your cooperation with
  - Infrastructure manager/s
  - Governmentally owned railway undertakings
  - Service providers
  - Private railway undertakings
  - International railway undertakings / service providers / other companies
- Does the cooperation have negative aspects? If yes, kindly describe.
- When considering cooperation with others, which topics should be developed?

10. GOVERNMENTAL BODIES' ACTIONS

- Kindly describe your cooperation with governmental bodies.
  - Has the needed documentation created challenges?
  - If questions arise, how easy it is to get help from governmental body?
- Kindly define the confronted strengths and weaknesses when dealing with governmental bodies.
- Have you faced cumbersome situations, where only governmental body has been able to help? If yes, kindly describe the situation.
- Development ideas

The semi-structured questionnaire /HETUKI Educational institutions

11. BACKGROUND INFORMATION

- History
- Basic information (amount of personnel, students, annual approval rate, location, possible branch offices etc.)
- Training programmes
- Additional information

12. ENTERING THE RAIL EDUCATION MARKET

- Why your school was established?
    - What was the main reason to start to provide rail education?
- Kindly describe the situation when your institution entered the market
    - Market entry barriers
    - Confronted challenges or difficulties
        - How those were handled?
    - Positive matters
- Where you gathered the personnel?
    - Previous experience
    - Qualifications
- School's strengths and weaknesses

13. MARKET ENVIRONMENT

Overall situation in rail-related service market

- Kindly describe rail-related service market in the country
    - How the rail-related services are organized?
    - Based on your experiences, is the way of action functional? Why?
        - If not, kindly describe what should be changed.

Rail education market

- What was the situation in the educational market before your school was established?
- What kind of expectations you had concerning the demand?
- How your students find information about your school?
- Who pays the education? (E.g. government, railway undertakings, students)
- Do you utilize rail simulators in teaching?
- Level of competition in rail education market
    - Does the market have free competition?

- European Union
- Has the market liberalization (e.g. harmonization, ERTMS etc.) affected the education? If yes, how?
    - European Union increases the interoperability and overall the internationalization of European rail market. Does this influence on education?
    - Has international relations increased during the last years, e.g. do you have international students?
    - What kind of challenges or possibilities EU regulations are creating?

- What is your opinion, is "a common language" needed in the future?
- Based on your experiences, what kind of professional skills are needed in the future?
- Do you think some improvements are needed in the market? If yes, what kind of improvements?
- Development ideas & future prospects

14. <u>COOPERATION WITH OTHER ACTORS IN RAILWAY MARKET</u> (E.g. railway undertakings, service providers)

- Kindly describe your cooperation with other actors in railway market
    - Do you have cooperation with…
        - Governmentally owned railway undertakings?
        - Infrastructure managers?
        - Private railway undertakings?
        - Other educational institutions?
        - Service providers (e.g. maintenance)?
        - International actors (railway undertakings, educational institutions, service providers)?
- Does the cooperation have negative aspects? If yes, kindly describe.
- When considering cooperation with others, which topics should be developed?

15. <u>GOVERNMENTAL BODIES' ACTIONS</u>

- Kindly describe your cooperation with governmental bodies.
    - Has the needed documentation / required certificates etc. created challenges?
    - If questions arise, how easy it is to get help from governmental body?
- Kindly define the confronted strengths and weaknesses when dealing with governmental bodies.
    - Development ideas

Appendix 9

Interviewed persons

Bigom Jan, Arriva, Denmark

Christensen Marianne Fryd, DSB Øresund, Denmark

Cleland Ian, Network Rail, UK

Greijer Rolf, TCC, Sweden

Hornegård Peter, TCC, Sweden

Jensen Jens Arne, Regionstog, Denmark

Jones Nigel, DB Schenker Rail, UK

Jönsson Stellan, Järnvägsskolan, Sweden

Kandell Johannes, Euromaint, Sweden

Lemvigh Lars Nordahl, DSB Øresund, Denmark

Leopoldson Oscar, A-Train, Sweden

Nilsson Jan, Järnvägsskolan, Sweden

Priisholm Søren Neess, EUC Syd, Denmark

Simons Richard, Davis Wagon Services, UK

Sundman Marina, Jernhusen, Sweden

Thulin Fredrik, Mantena, Sweden

Weiss Klaus, mgwService, Sweden

Whelpton Ian, WH Davis, UK

Woodburn Allan, University of Westminster, UK

Sweden, general market conditions

General market conditions
Many people have background from SJ.
Biggest weakness is lack of flexibility.
Small companies have the highest flexibility.
Sweden is the main growing market in Europe.
Trust of customer is needed.
People are recruited from other railway undertakings.
It's important to have a good mix of people.
Business has really high fixed costs.
Railway industry is rather traditional and some issues are always important.
Matters related to minimum access package are functioning rather well.
Swedish market has three problems: tracks, climate and infrastructure.
Infrastructure (both access and condition) create problems.
Winter season creates challenges.
More attention should be paid to maintaining infrastructure before having problems.
Infrastructure creates challenges: Traffic is increasing.
Today the prices are the same, no matter what time you start the journey.
The fact that slot times are given for one year is a great problem.
Trafikverket needs to improve their service.
Trafikverket should be more open.
Politicians both locally and nationally are creating more possibilities to commute.
Market needs stability and clear rules about the market preconditions.
Competition is needed in order to have efficient market.
It's important to look the customers' perspective.
No one is taking whole responsibility.
Best way to organize the market would be to have a pool, which would own all rolling stock.
EU has important role to play.
No one is aware of how to proceed with EU legislation.
It takes long time to create interoperability.
Market needs new competence.

Sweden, education

Education
Really high market entry barriers.
Rail education market has free competition.
Teachers have long background in railway companies.
Most important way to get publicity is via mouth to mouth.
Students come from railway companies or enter the school just like to any other school.
Education can be entered from different angles.
All operators should take responsibility for let the train drivers practice.
Same kind of education is needed also in the future.
ERTMS might change the education.

Sweden, maintenance

Maintenance
Earlier competence of maintenance was within the state railways.
The market is not that big, but naturally there's a difference if you have three or one company participating in tendering process.
Competition creates new opportunities for more flexible business setups.
Deregulation initiated the expansion of several maintenance related services, e.g. cleaning.
Today the maintenance market is competitive.
Good competition in Swedish maintenance market.
Organizing maintenance differs a lot between companies.
Personnel comes from schools and industry.
Mixture of people is important.
Flexibility is among the required qualifications of maintenance workers.
Hard to find personnel with many years' background in maintenance.
Mobile service is increasing, which requires special type of service technicians.
Contracts vary between customers.
Often contracts are based on kilometres the trains are running.
Today the locomotive is a PC on wheels.
All workshops are not ready to maintain sophisticated locomotives.
Customers are looking for lowest price and best service.
The choice to outsource maintenance was a strategic issue.

Sweden, maintenance problems

Maintenance
Access to workshops and infrastructure is problematic.
High-cost components create problems.
Biggest questions are how and where to get a workshop, tools and high-cost components.
There should be a central place which would provide all spares etc.
If you can cut the lead time, customer can get really big cost advantages.
Everything is made or designed to keep trains running in traffic.

Sweden, ticket sales and stations

Ticket sales and stations
Ticketing system is really difficult area.
Ticket sales system a great problem.
Every company has their own ticket system.
Today tickets are mainly sold via vending machines or Internet.
Stations are mainly owned by operators or Jernhusen.

Sweden, cooperation

Cooperation
The cooperation has worked really well.
Good support from customers is required in order to succeed in the market.
Cooperation is good, but it's strongly related to people.
Good relationships with most of the market actors.
Good cooperation with other actors is vital in order to succeed.
Cooperation is rather good although there is a lot of competition.

Denmark, general market conditions

General market conditions
All basic agreements are mentioned in tenders.
Market entry barriers do exist.
The main market entry barriers are car and bicycle.
Real competition is between the transport modes.
The main tracks in Denmark should be electrified.
Interoperability and electrified lines do not match in Denmark.
Politically maintaining the infrastructure is not a good idea.
Infrastructure maintenance is sometimes postponed.
Too ambitious timetables.
Danish incentive program concentrates on high punctuality.
When companies are paid by driven kms, they aren't interested in giving good service.
Issues related to minimum access package work well, problems relate to information.
Positive personnel important.
It all relates to people.
The general attitude towards rail transport is positive, especially in regions.
Danish market is functioning well.
Competition is not free because DSB is too big.
Strong influence of Railway Union should be considered.
Politicians are afraid of doing something what they are not totally sure about.
Denmark is one of the countries which is really strictly following EU rules.
All actors should have same target.
More money should be used for parking facilities around the stations.
Deregulation process should always be carefully planned.

Denmark, education

Education
It was state's decision to change the structure of the Danish rail education market.
Railway education is available only in two schools in Denmark.
If you want to become a locomotive driver, you first need to have the workplace.
All students are coming from companies.
All companies are giving some additional education.
When planning the education, the concentration should be on students.
The teachers are coming from companies.
In future, ERTMS can change the educational market.
All locomotive drivers who drive in Denmark, need to be educated in Denmark.

Denmark, maintenance

Maintenance
Maintenance is done in-house due to taxation.
Operators have own maintenance depots.
Operators own employees are making the maintenance.
Some operators in Denmark are doing the maintenance best in Europe.

Denmark, ticket sales and stations

Ticket sales and stations
It's possible to use the same ticket throughout the Denmark.
Private operators can also have their own tickets, which are cheaper.
Ticket system is working fine in Denmark.
The ticket system is the same around Denmark.
Some stations are owned and maintained by DSB, some by Banedanmark.
Operators have their own restrooms.

Denmark, cooperation

Cooperation
When starting the business, governmental authorities were helpful and friendly.
Really good cooperation with other market actors.
Market actors support each other nicely.
The actors should respect more each other.
Good cooperation also from government bodies' side.
Some cooperation with other actors.
Sometimes hard to work with big organizations.
Personnel's adequate knowledge level should be confirmed.
Personal connections and relations are really important.
Personal relationships are really important.

The UK, general market conditions

General market conditions
British railway market is heavily oriented towards passenger market.
Market has complicated mix of types of organizations.
Always substantial private sector involvement in rail freight.
No shortage of rolling stock in the UK, open access to sites.
Railway is rather open market, some competition.
Small companies are finding it hard to compete with big players.
There is free competition.
The UK rail infrastructure is very different from mainland Europe.
Infrastructure has improved enormously.
Minimun access package functions reasonably well.
Main challenge with infrastructure is capacity.
High-speed lines are needed.
Change of planning from 1 to 5 years is positive.
Market is functional, especially railway freight market.
Although there are a lot of challenges with the Channel Tunnel, it creats possibilities.
Government bodies are led by politicians, political processes involved.
Strong regulatory culture creates challenges.
Way to do things should be speeded up and more service culture needed.
Eu should stop changing things.
Political support and independent regulatory body needed to make deregulation work.

The UK, education

Education
Companies educate the locomotive drivers themselves.
Companies train people in-house.
The competence of employees is checked carefully.
Various companies offer extra training.

The UK, maintenance

Maintenance
Maintenance has changed over the years.
Some FOCs and TOCs do their own maintenance.
Maintenance in the UK much more expensive than mainland Europe.
Maintenance industry is audited more than other industries.
Problem: no covered facilities.
Maintenance regimes are functional.
The margins aren't high enough to encourage new nationwide entrants.

The UK, ticket sales and stations

Ticket sales and stations
Stations are owned by Network Rail or operators.
Stations having multiple users are critical.
Two types of tickets: interoperable tickets and tickets for certain operators.
Too much cardboard tickets, not enough on-line.

The UK, cooperation

Cooperation
Cooperation is generally good.
FOCs tend to work closely together.
Relationships are nowhere near as good as those could be.
Today there's a bit more of spirit of cooperation.
Way of organizing the market has direct influence on level of cooperation.
Overall the regulatory side works fairly well.
Some governmental bodies should be less involved.

Liikennevirasto

Finnish Transport Agency

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